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THE *Age of Steel* indignantly denies that it took any part of its recent article on hydraulic transmission of power either directly or indirectly from the ENGINEERING AND MINING JOURNAL, but asserts that it took it from a paper by Mr. E. B. ELLINGTON in the proceedings of the Institution of Civil Engineers of London, which we had credited with part of the information in our article. That paper was read in April last, while the data which we gave, and which the *Age of Steel* copied nearly verbatim, included figures up to "July of this year." Some of the matter related to work completed in October of this year. This information we received from Mr. ELLINGTON in a private letter in the month of November. Where did the *Age of Steel* get it? Clearly not from the paper read in April, as we were informed in its last issue.

IT is said that plans have been prepared for the extension and improvement of the mint at Philadelphia, $220,000 having been appropriated at the last session of Congress for that purpose. No doubt that mint sadly needs "extension and improvement," but this patchw ork system is simply a waste of money. What this country needs is one well designed and well equipped mint, furnished with the most improved machinery and appliances for doing the work well and economically, and no amount of improvement in the Philadelphia mint can secure this, as was fully set forth in THE ENGINEERING AND MINING JOURNAL, July 14th. If our minting were done at one central, well appointed mint. it would unquestionably effect a great economy in the work. This department of our government manufacturing is at present in a very unsatisfactory and discreditable state, not through any fault of the present director of the mint or his subordinates, but through the entire inadequacy of the plant provided to do the work. Any patching up of the present mints must simply postpone the day when a creditable establishment shall be built, and tend to continue the present necessarily expensive system.

THE study of human nature, so-called, at its best, is greatly facilitated by a critical attendance upon such scientific conclaves as have this year twice honored Milwaukee as their place of meeting. It may be remembered that the composite facial and mental type which the analysis of an observer found to be the average characteristic of the American Society of Civil Engineers was firm of chin and strong of nose—pointed, positive, pushing. A similarly critical psychologic comparison of the features and bearing of the members of the American Public Health Association discovers a composite of radically different type. Strength here is made subsidiary to determination; drive to persistence; the sharp to the blunt—a contrast so great that many at a superficial inspection might pronounce it dull. These sanitarians, taken one with another, are obviously a sober, serious, sententious body of men. Their beards, as a rule, are full as their heads are bald; they are older, too, in years, by quite a little, than their brethren whose domain is applied mechanics and mathematics. What there is in integral calculus that so markedly differentiates its devotees from those addicted to the study of the hepatic and renal variety, is not far to seek. It has, therefore, not been astonishing to find that the papers read at the Athenæum this week have been lacking in that directness of view and terseness of diction which was so marked a characteristic of those presented for discussion in the same institution during the closing week of June last; nor has there been much of any public discussion.

SOLID FOUNDATIONS VS. SPRING TIMBERS FOR STEAM STAMPS.

The use of spring timbers in the foundations of steam stamps has had a long period of unquestioned popularity. There apparently never was any reason why stamps should be set on a yielding bed, except that possibly the first or one of the first built was so made to lighten the blow for fear of breaking the mortar. It has long been well known that in steam hammers it is essential for efficiency that the anvil block be very heavy and solid, and yet the spring timber tradition for stamps continued to survive. Mr. REYNOLDS, the able mechanical engineer of the Reliance Works, Milwaukee, some months ago put in a solid foundation in the new Tamarack steam stamp, and the result has been extremely satisfactory. The mine, until recently, was not furnishing sufficient ore to keep the stamps all running continuously, hence it was impossible to say just how much ore the new head could crush; but some weeks ago Captain DANIEL, the superintendent, arranged for a steady run for six days with the new stamp, and the result was an average of 326 tons of hard Calumet vein rock crushed per 24 hours. This is the best work ever done by a steam stamp.

A solid foundation has now been placed under No. 1 head of the Calumet & Hecla mill, and a correspondent writes that this has increased the amount of rock stamped 40 tons, or from 220 to 260 tons per day, without increasing the quantity of steam used.

Evidently the day of spring timber foundations for stamps has passed, and in a few years it will be a matter of surprise how the tradition held its own so long.

IMPROVEMENTS IN FERRY BOATS.

At the Exhibition recently held at Glasgow, perhaps no feature was more interesting, or more strongly represented, than the novel designs in shipbuilding furnished by the yards of the Clyde and neighborhood; as, indeed, was only natural, for if we do not find novelties and perfection in this branch of engineering skill there, where are we to look for them. It is impossible to do justice to all the merit assembled, but the models of three types were so striking that we wish to place them on record. The first of these is a ferry-boat designed for the traffic between Liverpool and Birkenhead, and now running, and it is claimed with such satisfaction that we expect sooner or later to see similar ferry-boats displace the paddle steamers now in use on the North and East rivers. The Oxton is the name of the vessel, and she has four screws, two at each end, by means of which it is said that in addition to great facilities for quick turning and handling, she

can be brought to a full stop from full speed in her own length, and it follows is much more handy in making a landing than a paddle boat. She has two pairs of compound surface-condensing engines with inverted cylinders 19 inches and 32 inches in diameter, with a stroke of 24 inches. Low boiler pressure of 65 pounds, supplied from two cylindrical multitubular boilers 10 feet by 10½ feet long. The propellers have three blades, right and left-handed, and are worked at 100 revolutions a minute, each independently. Her length is 130 feet, breadth of beam 45 feet, and depth 14 feet. The builders are Messrs. SIMONS & Co., Renfrew.

The same builders had another interesting exhibit in the same line, also on the four screw principle, viz., a ferry-boat, with an elevating deck extending the whole length of the boat and occupying about one third of the breadth. This is, of course, to meet the requirements of tidal rivers to effect an easy landing at the stages or piers at all states of the tide. By the aid of steel uprights the deck is raised or lowered by the working of vertical screws fixed to them, and the motive power is two auxiliary engines of the surface condensing type.

The third remarkable model was that of a steamer, which by this time we believe is in service on the great lakes, built for Messrs. THOMAS MARKS & Co., Port Arthur, Ontario, by Messrs. Napier & Co. Her dimensions are 245 feet by 40 feet, and, being too long to go through the locks to her destination, she was so constructed that after crossing the Atlantic and going up the St. Lawrence she was to be cut in half to make the canal passage, the engines and boilers being placed in the after half. This required much ingenuity to make each half with sufficient stability for trimming and towing. Two bulkheads were built of steel, the distance apart being about 16 feet, and the plates of the hull and the decks between these bulkheads were practically dovetailed. The capacity of the vessel is 2000 net tons, and her gross tonnage 1800 tons.

THE QUAKER BRIDGE DAM.

One of the incidental evils of the frequent changes that have taken place in the New York Aqueduct Commission is, that each new set of Commissioners feels bound to vindicate its own integrity and intelligence, or to satisfy vague popular suspicion, by overhauling, if not undoing, the work of the preceding set. We do not speak of this as matter for either blame or surprise. It is a pity, however, that in these periodical re-examinations, things once settled and fundamental cannot be spared; and it is a further pity that the absence of memory on the part of the newspapers should produce in the public mind a similar obliviousness, dealing to misplaced patience and impartiality in the re-investigation of old questions, already thoroughly discussed and decided.

The Quaker Bridge dam offers a case in point. The new Aqueduct Commission has felt obliged to re-open, for the seventh time (unless we have lost our count), this ancient discussion; and one might infer from the sapient comments of the daily press that the full and impartial hearing which should have been held long ago is now at last in progress. But the files of these very papers show that the Quaker Bridge dam has been from the beginning an essential part of the new aqueduct scheme; that, without it, the expensive size and style of the aqueduct would not have been justifiable; that the project was fully discussed by ISAAC NEWTON and BENJAMIN S. CHURCH in their reports of 1882, 1883 and 1884, and that Chief Engineer NEWTON'S report of February, 1883, was accompanied with an opinion from Messrs. JOHN B. JERVIS, JAMES B. FRANCIS, GEORGE S. GREENE, JULIUS W. ADAMS and ROBERT K. MARTEN, "unhesitatingly" recommending "the Quaker Bridge plan as *the best, in fact the only*, plan that can, consistently with the best interests of the city, be adopted, for securing a large additional water-supply from the Croton Basin." (Italics ours.) The same files show also that the whole matter was re-opened in the winter of 1886-1887, and that, as the result of another hearing, the Aqueduct Commission voted (one member alone dissenting) to commence the construction, already too long delayed, of this essential adjunct to the aqueduct.

No new light is thrown upon the question in this fresh examination of it. The same old, oft-refuted arguments are brought forward, largely by the same venerable opponents of the dam; and we have no doubt that after the stereotyped discussion there will be a new edition of the stereotyped decision. Meanwhile, the fresh delay postpones the time when the full benefits of the aqueduct will be realized to the city.

We shall not reargue the merits of the question here. A summary of our opinions concerning them will be found in the ENGINEERING AND MINING JOURNAL of March 19, 1887, since which time no facts have come to light which would lead us to modify the statements we then made.

Leonard's Water Jet Propeller.—At Lenox's shipyard, in South Brooklyn, a vessel is in course of construction which the designer claims will travel at the rate of 30 miles an hour. The propelling force is to be a slender stream of water discharged under tremendous pressure through a one-quarter inch nozzle, from which it will emerge as rigid as a bar of steel.

CORRESPONDENCE.

We invite correspondence upon matters of interest to the industries of mining and metallurgy. Communications should invariably be accompanied with the name and address of the writer. Initials only will be published when so requested.

All letters should be addressed to the MANAGING EDITOR.
We do not hold ourselves responsible for the opinions expressed by correspondents.

La Luz Mines of Mexico.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: I beg to draw your attention, and with your permission, that of the readers of the JOURNAL, to the following facts: A company has been incorporated in London with a capital of £210,000 to purchase these mines in the State of Jalisco, and of that amount the promoters offered £50,000 for public subscription, in shares of £1 each, 5s. upon application, and 15s. on allotment. The vender or venders showed their confidence in the property by accepting £170,000, payable as to £160,000 in fully paid shares, at the option of the directors, and as to £10,000 in cash, leaving £40.000 to be used. I presume, as a working capital. The large holding of the venders, £160,000, in comparison with that of the public, £50,000, of course leaves the control of the property in the hands of the venders.

Turning to the quotations from and the statements made upon the various authorities, placed in great prominence upon the front of the prospectus, I comment briefly, as I do not expect you to find space for full analysis.

Mr. Ellis Read, Government Commissioner of Mines to England for the State of Zacatecas, Mexico (whatever that may mean, but I believe it to be a purely imaginary title), deals with the "has been" of the property. He also estimates that the "San Miguel" has some 10,000 tons of refuse ore on the dumps that would yield at the lowest estimate $40 per ton. He then follows by a quotation from Mr. Watkins as to what could be accomplished by the employment of only a 30-stamp mill. Further on, Mr. Read also assists his own expressions by quoting Mr. Watkins as saying that "he —— selected it when he had all Jalisco to choose from." I am rather at a loss to understand why Mr. Read should quote Mr. Watkins as the latter appears later as speaking for himself.

Mr. Thomas Pell has "learnt from an old miner" all he vouches for. The "old miner" is a well-known figure, and all are familiar with his reliability as an authority. Duncan Cameron, evidently belonging to a nation with "caution" as a motto, says: "I descended the shaft as far as I possibly could and took out a piece of ore that assayed $280 silver and $25 gold per ton." He neglects, however, to say how far from the bottom of the shaft his visit of inspection terminated, and also by what accident such a valuable piece of ore had been overlooked. He further says, "the amount of ore, especially medium class, judging from what is in sight, is almost unlimited. The San Miguel mine has some 60,000 carga of silver ore *which contains gold in the dump* (the italics are mine) ready for beneficiating." It would be a good thing if Mr. Cameron would instruct the world in general in what particular formation is found "gold in the dump."

All that is stated in Mr. John Amman's report that calls for remark is "The ores of San Miguel contain a considerable *alloy* of free gold." Gold as an "alloy" was to me rather a novelty, so I looked up the subject; and find "Locke" says "Fine silver is silver without the mixture of any baser metal. *Alloy* is baser metal mixed with it." We trust that the "*alloy* of free gold" has not seriously prejudiced Mr. Amman against the La Luz mines.

Last comes "James T. Watkins, Esq., an American mining engineer of high repute, well known and certified to by the *Nevada National Bank of San Francisco*." Mr. Watkins may have an existence, and I presume he has, but there is no such bank as the Nevada National Bank of San Francisco. However, he does not say much beyond stating the value of specimens and samples, which, it is needless to say, is but slim evidence of value.

The properties that the La Luz Company have acquired consist of mines worked by Mexican owners to a certain depth, beyond which they could not go for want of the necessary machinery for hoisting the ore and handling the water. The statement made in one of the reports that there are 20,000 tons of $40 dollar ore on the dumps seems very improbable; but granting that this is a fact, it is still more improbable that it can be worked at a profit by using the existing machinery, as proposed by the directors. The Mexican miners, notwithstanding a popular impression to the contrary, are good workmen, and can obtain by their methods of treatment as good and oftentimes better results than the foreigner with improved machinery. It may be safely assumed that the profits to be looked for must come out of a further development in depth of the mines, and this being the case, the price paid to the venders is unreasonably high. They receive £10,000 in cash and £160,000 in shares, for what? For allowing the public to subscribe £50,000 to be devoted to the development and equipment of their property, which can have no commercial value until that is done.

It is not to be supposed that the venders get the £160,000 in shares. In fairness, I must mention the promoters, who have, of course, to be paid. What proportion of these shares do they get? Taking the marketable value in Mexico of properties in the condition of the La Luz, there can be no doubt that the larger portion of this stock is promotion stock, and costs only brains and a little money for advertising. Such a conclusion as this gives color to a report that before the company was brought out the promoters entered into a contract with jobbers on the Stock Exchange to supply stock as required at 12s. a share, and paid 1s. a share for commission in negotiating this contract. Those of the public who subscribed for stock at £1 per share will need all their courage and patience to realize on this venture.

Latest quotations for the shares of this company are 7s. to 8s., so we don't suppose the jobbers are calling for much on their contracts.

I give these particulars to inform the JOURNAL upon what "trash" a Mexican mining property can be sold in London and to protest in the name of those interested in the welfare of Mexico against such swindles being perpetrated, as they only injure the progress and reputation of the country.

MEXICAN.

Dakota Mining Interests.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: The following items relating to what is going on in the Black Hills may prove of interest to the JOURNAL. I was agreeably surprised on reaching the railroad terminus at Whitewood to find I had not more than nine miles of staging to reach Deadwood, which took us two hours, instead of the two days and nights journey from Pierre when I was here before. Mining men, both Republicans and Democrats, are pleased with the prospect of the speedy admission of the two Dakotas as States, as all are anxious to get rid of the alien law that now holds back foreign capital from investing in the territories, and no doubt the Hills will get their share, as there appear to me to be good opportunities for large capital here in mining and other enterprises. On entering Deadwood, the first thing that attracted my attention was the Reduction Works that the Deadwood Reduction Works Company, composed of Deadwood men, is now building. These works are intended to treat Bald Mountain and Ruby refractory gold ore, and the capacity is fifty tons per day. It is an immense building, larger than any of the Homestake 120 stamp mills. The cost of building and plant was estimated at $60,000; but I am informed, and I believe from what I have seen of it, that it will cost nearly $100,000. Mr. Clarke, who built the Cortez leaching works at Cortez, Nev., now owned by an English company, is the designer and general manager of the works, and like those in Nevada, the ore here is to be treated by the leaching process, only with the variation that the ores here are to be roasted with a copper or iron matte—a process Mr. Clarke discovered and patented—whereas at Cortez no matte was required. Mr. Clarke has contracted with the reduction company to superintend the building of the works for $300 per month, to run it three months to work the ore to 80 per cent of its assay value, and in case he does this he is to receive the further consideration at the end of that time of one per cent royalty for all the ore worked, and $10,000 cash. Further, this company has the right to use his process at all times for one per cent royalty, while others can not use it for less than three per cent. The works are situated seven miles from the mines that are to supply the ore, and already surveys are being made by the Deadwood Central Railroad Company for a narrow gauge road between the works and the camp. At present this company have their surveyors camped at Ruby running preliminary lines to the different producing mines. There seems to be no doubt that the roads will be built next summer, if the reduction works are a success, and all interested in them feel satisfied that they will be. The same railroad company is building a line of railroad three miles and a half between Deadwood and Lead City, which will be finished in a few weeks. A portion of this line up Gold Run Creek is rather a rough piece of road to build, and the grade in some places is 8 per cent.

Anticipating trouble with ordinary brakes in frosty weather, the company are having a clutch put on their cars, that is so adjusted as to clasp the rail in case the brakes don't hold. The cost of grading this road will be about $13,000. There is a street car railroad being laid in Deadwood at present. Returning to Ruby Basin and Bald Mountain districts, which are the center of attraction at present, I find the mines are nearly all incorporated, the stocks being very active at present and traded in to the amount of a great many thousand shares each day. Golden Reward sold for twenty cents three weeks ago and is now 65 cents. Ruby Bell, in face of one cent assessment, advanced from 12 to 21 cents. Retriever, with 3000 tons of $25 ore on the dump, rose from 8 to 20 cents, and a whole lot of others have doubled in price in the past week or so. Still it is believed the highest notch for these stocks is not nearly reached yet. When the reduction works commence turning out bullion there will be a boom, and, unlike the boom, I am told, mining stocks had in Deadwood two years ago, when the Iron Hill was the only producing mine, these Ruby mines have large quantities of pay ore opened up ready to send to the works, consequently there is more basis for the movement. Take, for instance, the Golden Reward, the favorite stock at present. This company has contracted to send 4000 tons of ore to the works. Mining, hauling and treating will cost from ten to eleven dollars per ton. The ore is estimated to run over $30 per ton. This would leave a net profit on the 4000 tons of something over $70,000, or nearly thirty cents per share. Several other mines have a great deal of ore opened out. The Ruby Bell is reported to have a vein fourteen feet high of twenty-five dollar ore, and being located in the lower contact it appears to be the most permanent. The Calumet Company, who own two claims on the second or middle contact, have a tunnel five hundred feet long that shows an ore body four feet high the whole distance, averaging forty dollars per ton. The most inactive company with valuable claims is the Terry's Peak Company, a New York incorporation which took over the property of the Welcome Mining Company about a year ago. Under the old company there were thousands of dollars thrown away recklessly in everything the company undertook. I was told a good joke in connection with the sale of this property.

In the course of the investigation, the New York parties said they thought the water supply was not sufficient. The vender assured them there was ample, and walking over to a well dug for drinking water, shoved his walking stick to the bottom and measuring the depth of the water said, "Look here, gentlemen, see for yourselves, here are thirty inches of water," and the Homestake only uses thirty for a 120 stamp mill. On investigation the intended purchasers found that the Homestake used in their mills thirty miners' inches of water for 120 stamps, and not discerning the difference between miners inches of water and water thirty inches deep, they were satisfied, the trade concluded and a costly mill built, when it was discovered the water supply was insufficient to run one stamp.

What information I desire most I find the hardest to get.

It is difficult to learn anything about the Homestake mine or operations only in a general way. This is also true of Deadwood-Terra. Public opinion is that Deadwood-Terra is being worked in interest of parasite companies composed of its directors rather than in interest of its stockholders. The Black Hills Canal and Water Company furnish its stamp mills water at four dollars per stamp per week. The company at present have two 80-stamp mills of their own, and are running the De Smet 100-stamp mill. This makes 260 stamps, or $1040 per week for water. The Black Hills and Fort Pierre Railroad Company furnish the mills wood and mining timber, and the employés have to trade at the Hearst store, which also sells the mine its supplies, such as nails, candles, fuse, powder, etc. This is also true of the Homestake and Highland mines, but as the two latter pay their stockholders, the stockholders do not trouble themselves about it. I hear from reliable authority the Homestake is in a great deal better condition with regard to ore reserves than it was two years ago, also that there is plenty of ore ahead for a long time to come.

The Deadwood-Terra seems to be a permanent mine, and to have lots of ore ahead. The company are just completing their main shaft 100 feet deeper than the lowest adit tunnel run under the De Smet mill.

Caledonia is doing nicely by what I can learn; has ore enough opened up above the lower level for two years. They have recently increased the capacity of their stamp mill from 60 to 80 heads. This has been one of the worst worked and managed mines in the Black Hills until the present superintendent took charge. It was not only badly worked but poorly laid out for permanent working, necessitating the expenditure of large sums of money in driving long cross-cuts that get longer at each level opened out, until now the ledge is so far away from the main shaft it will require nearly all the profits of working the ground blocked out in opening it up. There are two fine chutes of ore in this mine, one on Discovery lode, the other on the Caledonia lode. The mine, no doubt, will pay dividends for a long time. The superintendent has 3000 shares of the stock. This shows his faith in the property.

I find a great many sick investors here over Iron Hill. Most of them are dissatisfied with the management, having lost confidence in it. All Carbonate Camp stocks are inactive, in sympathy with Iron Hill. Prospectors and others from that camp report a number of companies and individuals neglecting assessment work for this year, so there will be a great deal of ground open to relocation after January 1st.

Rapid City papers report the arrival of Professor Vincent, the English expert, whose report on the tin mines in interest of Harney Peak Company you criticised a few weeks ago. The papers note his departure to the mines with the party in charge, and naturally expect great things from his visit. Another personage, Mr. David Cock, I see, is at Rapid, who is a well-known company promoter in London, his name being frequently mentioned in the London papers in a not very complimentary way. Rapid papers, however, expect a great deal of him in helping them to bring the tin mines to the front, especially now that he is accompanied by two preachers, who are also promoters. In this connection I will say I have seen Mr. Thomas H. White, whose letters and reports so effectually squelched the Harney Peak London deal a year ago. Mr. White is being persecuted by Wilson's sympathizers in every way imaginable. He takes it good naturedly, and said to me: "The next thing I expect to be arrested for is the murder of the Harney Peak Company, but I hope I shall not be tried for it before a Rapid City jury."

White's chief persecutor in Deadwood is a man who had some interest in the old Harney Hydraulic Company which he bonded in the London deal for $10,000. He is without any visible means of support and no standing in this community, his sole occupation at present being apparently telegraphing specials to Eastern papers that would seem to cast reflection on White's character, and getting subscriptions for his own benefit to write up the country, especially the tin interest.

The ENGINEERING AND MINING JOURNAL does not escape condemnation from the angry sympathizers of the Harney Peak deal, especially the Rapid City papers. Mining men generally, however, concede the fairness of the journal's criticisms on the matter, and laugh at the idea of any one being able to sell such a property for $10,000,000, especially to our conservative English cousins.

At Galena the Silver Queen Mining Company have lately started up the smelter on their own ore. Mr. Terhune, formerly Superintendent of the Iron Hill, has charge. It is turning out considerable base bullion every day, and it is reported there is no lack of ore.

The Uncle Sam Mining Company is pumping water out of its mine preparatory to putting a Cornish pump in.

On the whole, I am very well pleased with the mining outlook of the Black Hills, and at present all kinds of business look prosperous.

MORE ANON.

Irrigation in India.—In the year 1886–87 the total revenue assessed on irrigated lands in Madras was nearly 230 lakhs of rupees, of which some 170 lakhs were due to irrigation, and the remainder to land revenue. Some five million acres of land were occupied for irrigation during the year, nearly four and three-quarter millions of which were irrigated in the first, and rather less than one million in the second crop; the total area of land which bore irrigated crops was over five and a half millions of acres. The larger systems, which derive their supply of water from the great rivers, have cost rather more than 500 lakhs of rupees to construct. These include among their number the one black sheep of the flock, the Kurnool Canal. *Indian Engineering* says: "The net profits in 1886–87 on the entire capital were 5·9 per cent."

[A lakh of rupees at present rate of exchange is about $36,500.—ED. E. AND M. J.

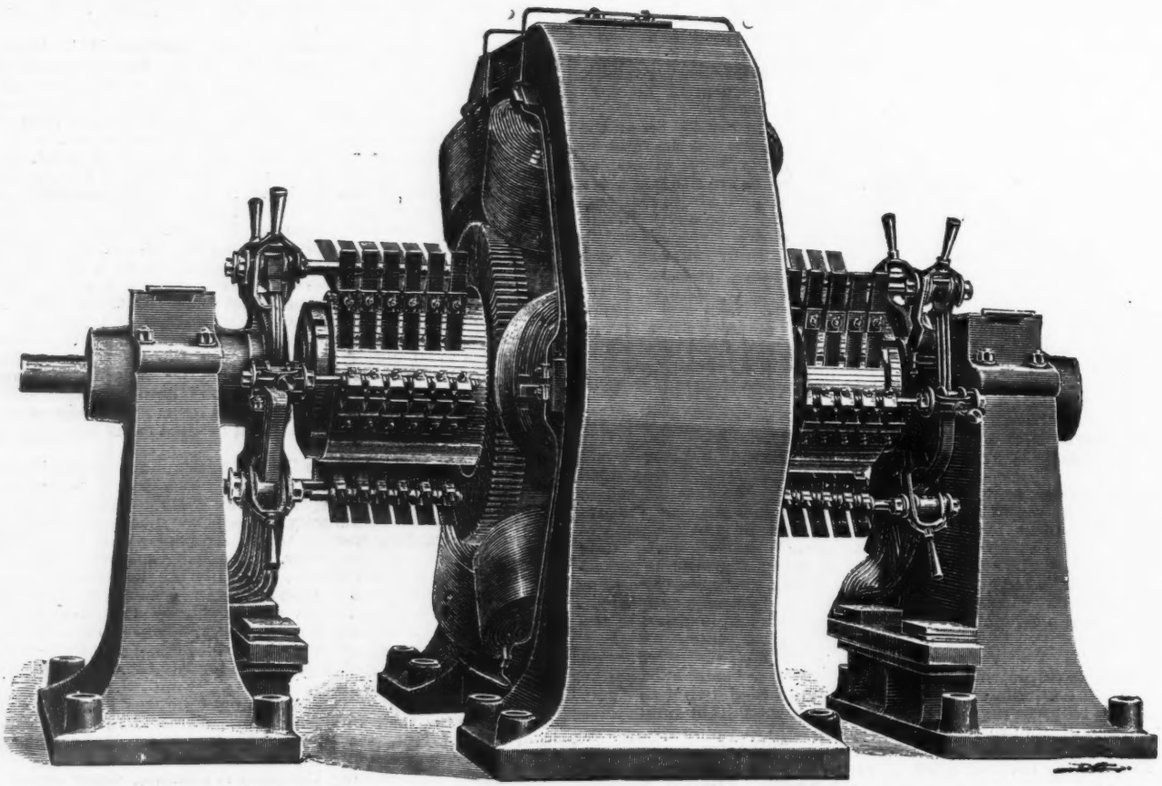
A Maritime Canal to Paris.—The project of connecting Paris with the sea by means of a ship canal is one of the schemes which makes a periodical appearance, says a correspondent of *Industries*. The last time it came before the public, which was quite recently, a report was presented to the Chamber of Deputies. According to this report the canal would go from Paris to Rouen, following the Seine for a distance of one hundred and ten miles, and its section would be 50 per cent larger than that of the Suez Canal, the depth being 20 feet. The principal ports in connection with the canal would be St. Denis and Clichy, and ports of secondary importance are projected for Andelys, Vernon, Mantes, Poissy, Archères, and Argenteuil. The total traffic is estimated at between three and five million tons annually. The report concludes with the recommendation that the government be invited to immediately institute a commission to examine the project so far as it relates to the canal between Paris and Rouen.

THE "HEROULT" ALUMINUM PROCESS.

We have already twice referred in the JOURNAL to the "Heroult" Aluminum Process in our issues of September 8th and 29th, and we now give a full description, with illustrations of the plant used, which we borrow from our contemporary *Industries:*

We had recently an opportunity of inspecting the works of the Swiss Metallurgical Company, established close to the Rhine Fall at Neuhausen, on the right bank of the river. The production of aluminum, and especially of aluminum alloys, by electrical means, forms one of the most important branches of the company's business; and after experimenting with Dr. Kleiner's method of producing pure aluminum, it was finally decided to adopt the method devised by M. Heroult for the production of aluminum alloys, and a large plant on this system is now successfully at work. As in the Cowles process, the aluminum is reduced from its oxide by means of a very strong electric current, but the action of the current is different in the two systems. In the electric furnace devised by the Brothers Cowles, the current is simply and solely used to produce an excessively high temperature in a limited zone, and the reduction of the ore is due to the high temperature alone, and is in no way an electrolytic process. The Cowles furnace can, therefore, be worked with an alternating current, but this is not the case in the Heroult process. According to the views held by the inventor of the latter process, the reduction of the ore is due partly to the heat of the voltaic arc and partly to an electrolytic action of the current. In the Heroult furnace the melted mass of oxide takes the place of the electrolyte in ordinary voltaic coupler, the reduced metal at the bottom of the furnace being one electrode and a carbon bar inserted from the top the other. Upon a current passing from the carbon bar through the ore to the metal, the ore is decomposed, oxygen traveling upwards and attacking the carbon, while the molecules of the reduced metal travel downwards, and are merged in the metal bath. The construction of the furnace will be understood from our Figs. 4 and 5, the former being a sectional elevation, and the latter a plan. The body of the furnace, or to speak more correctly, of the electric crucible, consists of a block of carbon *B* contained in an iron box *A*. In the first crucible made, the iron box was cast round the carbon block in order to obtain a very intimate contact between the surfaces, and thus facilitate the conduction of electricity from the electrodes *C* to the interior. The iron, by contraction upon cooling, would securely grip the surface of the box from all sides, thus insuring perfect contact. This method of construction is, however, only suitable for small crucibles, and the present large furnace is built up of carbon slabs held together by a wrought iron casing, no difficulty having been experienced in making good contact between the two materials. At the bottom of the cavity in the carbon block is a tap hole *D*, closed by a plug *E*, which is withdrawn from time to time to allow the liquid alloy to run into the ladle *L*, from whence it is cast into ingots. The current enters the crucible by the upper carbon electrode, consisting of a bundle of carbon slabs *F* suspended by a chain. The chain passes overhead round the drum of a small winch, which is controlled by the attendant, as the lower end of the electrode is being consumed, the latter is to descend so as to keep the distance between the surface of the molten liquid in the crucible and the end of the carbon electrode as near as possible constant. We may here remark that this distance is preferably made very small, and should in practice not exceed 3 millimeters, or say twice the thickness of a shilling piece.

The inventor lays particular stress upon the necessity of keeping the distance between the electrodes small. The intervening space, being filled with a layer of badly conducting molten ore, offers a resistance which increases with the distance; and although resistance is necessary in order that the current should produce heat, it is not economical to have more heat than is just sufficient to melt the ore, the work of separating the metal from the oxygen being chiefly done by the electrolytic action of the current, and not by high temperature. The electrode consists of carbon slabs *F*, held together by a metal clamp *G*, so as to form one huge compound carbon prism, which, before insertion into the furnace, is 10 feet long by 17 inches wide and 9½ inches deep. As the slabs are only obtainable in lengths of about 3 feet, the prism is built up of slabs laid upon each other so as to break joint, the whole being held together with stout copper pins, and protected on the outside by copper plates ⅜ inch thick. An electrode of that size is consumed in the production of about half a ton of contained aluminum. The crucible is closed by a cover *H*, also made of carbon slabs, but insulated from the body of the crucible. Holes *J* are provided in this cover through which the ore and scrap metal are introduced, and these openings can be closed by shutters *K*. The ore used is alumina free from silicon and other impurities, and the scrap metal is either iron or copper, according as the desired product is a ferro or a bronze. Bauxite could be used instead of alumina; but as the former mineral contains many impurities, M. Heroult prefers the absolutely pure though more expensive alumina. The cost of the raw material is, however, in either case not a very important item as compared with the cost of power, carbons, and amortization of plant. The process of smelting is a continuous one, and need only be interrupted when the upper electrode has been consumed, and then only for a short time required to insert a new electrode. The crucible is periodically charged through charging holes, and the molten alloy is tapped off at *D* from time to time. The production of aluminum per horse-power hour varies somewhat with the percentage of the metal contained in the alloy, the average being 30 grams of contained aluminum per horse-power hour, and the maximum 40 grams. Reduced to English measure, this works out to an expenditure of 15 horse-power hours per pound of contained aluminum under average, and 11 horse-power hours under very favorable conditions. The present production of the crucible is 4 hundred-weight of contained aluminum in 24 hours. The crucible can also be used for the production of silicon bronze, in which case the scrap copper is charged, not with alumina, but with clean white sand.



BROWN'S DYNAMO FOR THE HEROULT PROCESS.

Power is supplied by a turbine to the shaft of which are direct coupled the two dynamos supplying the current to the crucible. These large dynamos are excited by a smaller machine driven by a belt from the turbine shaft, as shown: and the speed of the turbine and strength of the main current are controlled by an automatic regulator acting upon a throttle valve placed in the inlet pipe of the turbine. Within certain limits the main current can also be regulated by hand, for which purpose one of Brown's electrical regulators is inserted into the exciting cir-

cuit of the small dynamo. The main conductors are naked copper cables or bars, and no special precautions are employed to insulate them, as in comparison with the huge working current a leakage of 100 ampères, more or less, is too insignificant a matter to trouble about. The current is measured by a large ampère meter, indicated by a circle in our illustration. The main current passes once through this circle, in the center of which is pivoted an electro-magnet, provided with a pointer and counter-weight. The electro-magnet is excited from a primary battery, giving a constant electromotive force, and the calibration of the instrument can be varied by fixing the counter-weight further from or nearer to the center of suspension of the magnet, so as to a fairly large deflection for the usual working current. During our visit the working current was about 12,000 ampères; but on several occasions a short circuit occurred, when the current would suddenly rise to 20,000 ampères and more. The short circuits are generally due to the fact that one or other of the carbon slabs composing the electrode projects beyond the others, and touches the surface of the metal bath in the crucible. The projecting portion is then immediately burnt off; but during the time that this takes place, the current is considerably increased beyond its normal value. It might be supposed that a short circuit of such magnitude would be likely to damage the electric machinery, but so far as we could ascertain this is not the case. The dynamos do not appear to suffer in the slightest degree from the short circuit, and the only indications that the visitor has of its taking place are a slight sparking at the brushes and a peculiar rumbling noise in the turbine. The dynamos were made to the designs of Mr. C. E L. Brown, by the Oerlikon Engineering Works, and the turbine was supplied by Messrs. Escher Wyss & Co., of Zürich. We illustrate the dynamos in Figs. 1, 2 and 3.

The field is of the multipolar type and made in one casting, so that there are no joints of any kind in the magnetic circuits. The armature is of the usual Brown type, with embedded wires, but contains two distinct circuits, each provided with its own commutator. The armature is 38 inches diameter and 24 inches long. The conductor consists on the outside of round copper bars *C* ⅝ inch diameter, and on the inside of flat copper plates (*A*) placed into grooves planed out of a wood lining, by which these plates are firmly held and at the same time insulated. The current is taken off each commutator by six sets of brushes, there being in all seventy-two brushes on each machine. Although cross connection between equipotential coils on the armature are not absolutely necessary when the number of brushes employed equals the number of field poles, the designer of the machine has thought such connections, nevertheless, advisable as tending to fairly distribute the work between all the armature wires, and equipotential sections of the commutator have therefore been connected by means of rings *B*. Each of these rings is provided with three projections containing grooves into which dovetail the corresponding commutator sections. As it was impossible to apply solder to make the joints, the surfaces have been silvered and made a tight fit. The machines were originally intended to give each a current of 6000 ampères at 20 volts pressure when running at 180 revolutions per minute; but in designing them Mr. Brown allowed a sufficient margin in the strength of the field to be able to work at 30 volts. This provision has been found very useful, as in certain circumstances the working of the Heroult furnace is rendered easier by an increase of voltage. We are told that even when working at 35 volts there is no undue heating of the armature core from hysteresis. At the time of our visit the machines were working at about 20 volts, and kept fairly cool. There is no fan provided for cooling. The brushes are not separately adjustable, and the lead from no current to full load is only ⅛ inch on the circumference of the commutator. There is absolutely no sparking at the brushes when running with the normal current, and notwithstanding the necessarily rough usage these machines are subjected to, the commutators were at the time of our visit in excellent condition.

THE "HEROULT" ALUMINIUM PROCESS.

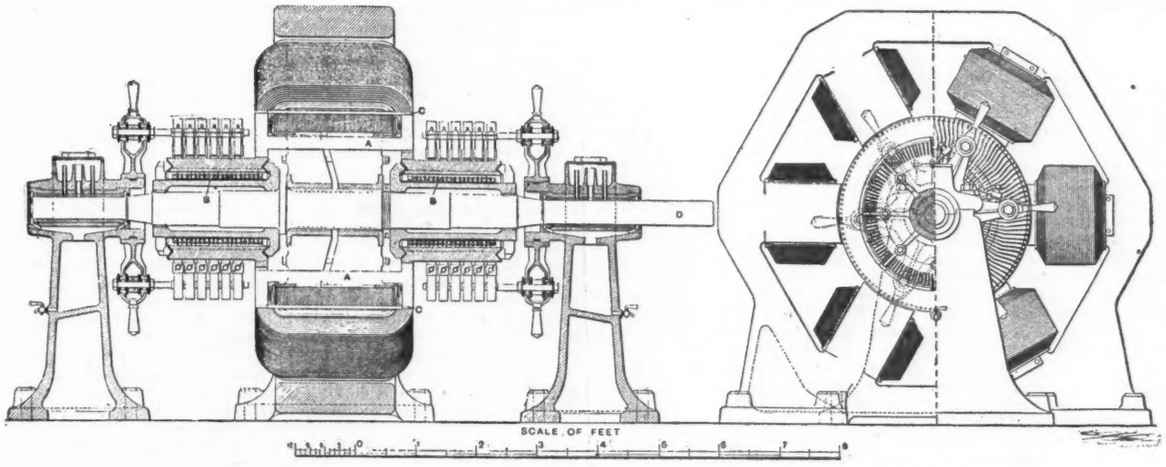


FIG. 2.

FIG. 3.

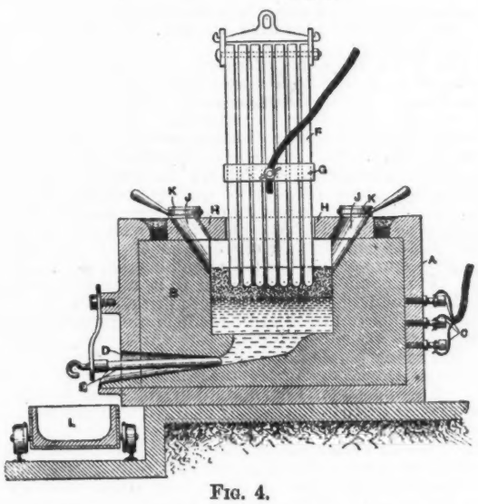


FIG. 4.

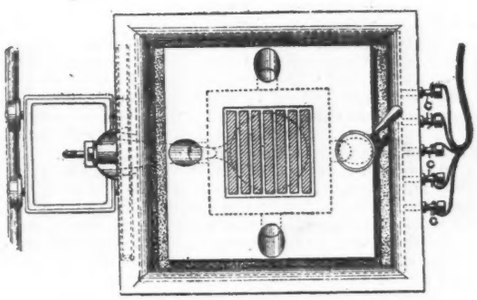


FIG. 5.

Rapid Vegetation on Volcanic Rock.—Dr. Treub, the director of the Botanical Gardens at Buitenzyig, Java, has published his experience with regard to the reappearance of vegetation upon the Island of Krakatan, which partly sank and was wholly overwhelmed by the ashes and pumice-stone from its volcano during the violent outbreak of 1883. Three years after this date Dr. Treub (on the 26th of June, 1886) visited the island, and as he approached it he found that it was covered with vegetation to the very summit of the mountain. The plants could not have grown from the roots or seeds of those existing before the great eruption, for the toughest organism must have been destroyed by the excessive volcanic heat. The whole island was covered with a layer of ashes and pumice-stone from 3 feet to 240 feet thick. Nor could the vegetation, Dr. Treub thinks, have been introduced by man, for the island is uninhabited and difficult of access. It must have been by means of seeds carried thither by birds, the wind or the currents of the sea that the new vegetation arose. It consists for the most part of ferns, of which eleven different varieties were found, and of single specimens of blossoming herbs, such as are found on coral reefs that have lately risen above the level of the sea. Dr. Treub has, however, found that the ferns were not the first living plants that had found nourishment on the destroyed island. Almost everywhere there were signs that the ashes and pumice stone had been covered by a thin layer of algæ, which rendered the surface of the soil soft and capable of absorbing water. These microscopic algæ prepared the way for the ferns, the latter, in their turn, for the blossoming herbs.

BELLITE.

We condense from our contemporary *Iron* the following description of certain tests of the comparatively new explosive Bellite, as we think they will be of interest to the mining and engineering community.

About three years since, Mr. Carl Lamm, a Swedish engineer and chemist, invented a new explosive to which, having in view its application to war purposes, he gave the expressive name of Bellite. A factory was built near Stockholm, in which its commercial manufacture was commenced toward the end of 1887. Since that time, owing to its power and safety, it has come into use in Sweden and Australia for general mining purposes in addition, which the Swedish government has adopted it for submarine mines, torpedo work, and for charging shells for artillery purposes. This explosive is composed of di-nitro-benzole and nitrate of ammonia in certain proportions, the ingredients being mixed together and then subjected to heat. While still warm, the plastic mixture is molded into cartridges, which, on cooling, are found to be more or less solidified. The cartridges are usually 5 inches long by ¾ inch in diameter, and weigh 1¾ ounces. Of course, the shape and size can be and are varied to suit special requirements. Bellite owes its practical success to the fact that it can only be exploded by the aid of a detonating cap, and to the claim that it undergoes no change from atmospheric influences. In order to demonstrate these points, the Bellite Company, of 2 Albert street, Manchester (which is introducing this explosive into England), arranged for a series of trials to be carried out with it at Middlesbrough.

Many prominent individuals interested in engineering and mining work were present, and the experiments, which were carried out by Mr. Lamm and Mr. Hake, had for their main object the demonstration of the safety, power, and special action of bellite. To this end, in the first place, an iron weight of 1120 pounds was allowed to fall from a height of 20 feet into a bundle of bellite cartridges placed on end upon a piece of iron boiler plate. The cartridges were simply crushed into a shapeless mass, a portion of which was afterwards placed in a tin case and exploded by a capped fuse. The explosion made a hole through the piece of ¾-inch boiler plate upon which the charge was placed, the metal being torn asunder rather than cut. Three 3-ounce bellite cartridges divested of their paper wrapping were then placed in the midst of one pound of gunpowder, and the powder was ignited. The cartridges were broken and scattered about, but they neither ignited nor exploded. It is held that a mass of bellite cannot be exploded by the explosion of a cartridge of the same material, provided a thickness of ¾-inch deal be interposed, that being the thickness of the cases in which such explosives are usually packed. A cartridge of bellite was therefore exploded on the lid of a closed case containing 2 pounds of bellite. The wood of the case, however, was only one half inch thick, and the result was that the contents of the box were exploded by the cartridge. A box was then made of ¾-inch deal, and the experiment was repeated with success, the box being broken and the cartridges scattered about. The safety of bellite when in contact with fire was demonstrated by placing pieces of a cartridge on a smith's forge, with the result that they were neither ignited nor exploded, but were simply melted, and frizzled slowly away, the forge being blown during the experiment. A portion of the same cartridge was then exploded by a capped fuse on a piece of boiler plate, to show that with the cap it no longer remained inert.

Experiments were next carried out to demonstrate the power of bellite, and they were made comparative with dynamite. Equal charges of each explosive were placed on pieces of ¾-inch boiler plate, and tamped with a handful of clay. On the first pair of plates one ounce of each was exploded, with the result that the dynamite made a hole, and the bellite an indentation, but which extended over a greater area than was covered by the hole caused by the dynamite. On the second pair of plates two ounces of each explosive was fired, the plate being blown through in both cases, but the fracture caused by the bellite extended over a greater area than in the case of the dynamite. The third pair of plates had each three ounces of explosive, and both were badly and about equally fractured. In the case of bellite, however, the bulge made was greater than that caused by the dynamite. This set of trials showed that the work done in each pair of experiments was much about the same, although there was a slight advantage in favor of bellite in the third pair. But the difference of action between the two explosives was very marked, and herein we perceive one of the most important features of bellite next to its safety, namely, equal, if not slightly superior, power to dynamite, but slower action and more distributed work. In the one case we have dynamite rapidly tearing and smashing all before it, while in the other we have bellite, by reason of its slightly retarded action, rending and pushing its way through the obstacles presented to it.

The remainder of the experiments of this class were carried out partly in pairs with charges of bellite and dynamite exploded on 70-pound double-headed steel rails, laid on their side, the charge being placed on the web and tamped with clay. In the first and second cases the charges were each 2 ounces of bellite, the explosion causing, in the first place, an indented fracture extending about 2 feet along the web, and in the second cutting the rail clean in two. With a corresponding charge of dynamite a hole was blown through the web, which was fractured for a length of 14 inches, and one head was slightly bent outwards. With a charge of 3 ounces of bellite the rail was broken up for a length of about 20 inches. With an increased charge of bellite, namely, 4 ounces, a length of 22 inches of the rail was destroyed, the fragments being much smaller than in the previous case. With a corresponding charge of 4 ounces of dynamite, the explosion destroyed 18 inches of rail, breaking the disrupted part into fragments of somewhat smaller character than with the similar charge of bellite. Here we have a confirmation of the results of the experiments with the plates and a further evidence of the more distributed action of bellite.

The second day was devoted to trials of a more practical character, which were carried out in the ironstone mines belonging to Messrs. Bolckow, Vaughan & Co., at North Skelton. These mines are very extensive, the output being about 1000 tons of the Cleveland stone per day. Descending the pit, which is 240 yards deep, the visitors proceeded about 1000 yards into the workings, the mine being both clean and dry. In this mine the holes are usually 1¾ inches in diameter, and are mainly drilled by the Burleigh rock drill driven by compressed air, the air being compressed by water power. The explosive used at Skelton is compressed gunpowder, and about eighty shots are fired there twice a day. The first hole charged with bellite was 4 feet 6 inches deep, and would have required 1¼ pounds of powder; but only 8 ounces of bellite were put in. The fuse was old and damaged, and should never have been used, but inasmuch as to the inventor's trustful, not to say sanguine, temperament all things are sure, it was used, with the result that a misfire followed.

After several failures, or partial ones, owing to the same and other accountable causes, a 4-foot 3-inch hole was now charged with 6 ounces of bellite, the usual charge being 12 ounces of powder. The shot was successfully fired, and the results compared well with those of gunpowder. Another hole 3 feet 2 inches deep in a bit of heavy ground was now found, and charged with 7 ounces of bellite, as against 14 ounces of powder. The shot was fired with a decidedly good result, getting the ground well. The final hole was 3 feet 2 inches deep, and was a good strong one, requiring 1 pound of powder, but in which 8 ounces of bellite were used. This shot was another success, the mine manager observing that nothing could be better, while another official observed that it could not have got a bit more. These successes were very gratifying after the previous failures, which, to our mind, were avoidable.

There yet remain two characteristics of bellite upon which it is necessary that we should touch before concluding. These are, firstly, its alleged flamelessness, and, secondly, the non-production of noxious gases upon its explosion. The first of these special features is of the highest importance in coal mines, while the second is of importance in every mine and close working. With regard to flamelessness, no experiments were made to prove this claim, but we had the opportunity of partially satisfying ourselves upon the point during some of the experiments. Upon more than one occasion, when bellite and dynamite were exploded competitively in the open, we watched for the flame, and more than once saw it shoot out from dynamite, but not once did we see any flash from bellite. Hence, so far as ocular evidence during daylight goes, we admit the claim of flamelessness, and we make this limitation without in any way wishing to throw doubt upon the statements made in this respect. With regard to the second point—the absence of noxious fumes after explosion—we are able to express ourselves without the slightest reservation. In every instance at North Skelton there was a hasty scamper back to the facing after the shot had been fired, in order to see what the result was, and in no case could the smell of noxious gases be detected. Had there been any, there were five good opportunities for detecting it, as the party remained some minutes at each facing, and remained altogether over four hours in the workings. The innoxious character of bellite in this respect was therefore proved beyond question. This feature means a great saving of time to the miner, who can get back to his work directly after a shot, instead of having to wait a quarter of an hour or more for the fumes, which are so detrimental to health, to clear off.

MINERAL WEALTH OF THE CHINESE EMPIRE.

Nearly all the useful metals are known to exist in the Province of Kuei Chou, and scores of mines have been worked for ages, with varying results, but in a very primitive manner. Says the correspondent of *Indian Engineering*:

Coal, iron and various ores of quicksilver are abundant in nearly all the Prefectures. In the Prefecture of Kuei-Yang Fu traces of gold and silver are found. A few persons earn their living by washing the sweepings of the street, which are paved with a hard white stone. Coal and iron abound in the surrounding hills, especially those two or three miles north of the city. Rich deposits of quicksilver have been worked for many years at a place called Peh-Ma Tung in the Sub-Prefecture of Kuei Chou. Cinnabar of superior quality abounds in Ting-Fau Chou. Sulphur, saltpeter, and some mercurial ores are also found in Kuang Shun Chou, and I have seen samples of ore which were said to be rich in antimony, also coming from one or other of the above Sub-Prefectures.

In the Prefecture of Ssu-Chou Fu gold, copper, iron, and coal are said to exist. Iron abounds, and is about to be manufactured into marketable stuff on the most approved modern principle, in Ch'ing Chi, Hsien, a county of the above Prefecture. Some mining machinery in charge of an Englishman has already gone forward for the Kuei Chou Iron-Works, just being established by his Excellency Pan Lu—a brother of the Provincial Governor—under the management of an Englishman, engaged for the purpose. Coal found in the near neighborhood of the iron deposits is said to be too heavily charged with sulphur for the proper manufacture of iron, but excellent coal, well adapted for the purpose, has been found in an adjoining Prefecture, and may be brought to the works partly by water and partly by a light railway, which it is intended to construct for the purpose. It is intended to manufacture steel direct from the pig-iron, I believe, on the Bessemer system, two small converters having been purchased to commence the process as an experiment. There is, however, an excellent market locally for horseshoe and nail iron. The manufactured articles may also be carried by water the whole way from the works to all the cities on the Yuan River, in Hunau, also on the Tung Ting Lake, and along the Yang-tze River to Shanghai, if the supply proves greater than the local demand. I believe, however, that the markets of Hu-nau will absorb as much as the works can produce for years to come.

In the Prefecture of Ssu Nau Fu, cinnabar is the only mineral I have heard of as found so far, but it is quite possible that coal and iron are also abundant, though not worked. The local forests furnish all the fuel that may be required for household use, so there has probably been no demand for coal, and the demand for iron has not been great enough to induce any one to embark in its manufacture probably. In the Prefecture of Chên-Yuan Fu, coal and iron abound everywhere, whilst silver and lead are said to exist in several places, and have actually been worked in one place at least, not far from the Town of Chung-Au, Ssu, on the river of the same name.

In the Prefecture of L'ung-Yên Fu, rich veins of copper are said to have been found, iron and coal abound, and a very rich deposit of some kind of metal, said to be white as silver, brittle as black lead, and as fusible as sheet zinc. It has sometimes been passed as silver amongst the local peasantry. Cinnabar and other ores of quicksilver are also said to exist in this small Prefecture.

In Au-Shun Fu Prefecture, coal and iron abound everywhere. Some of the coal being of excellent quality, may be burnt in an open brazier like charcoal, without danger or nuisance. Cinnabar and other ores of quicksilver are also found.

In Hsing-Yi Fu Prefecture, coal and iron are found in various places; cinnabar and ores of quicksilver also exist, and have been worked rather extensively. Copper and zinc are also said to exist, but the ores are rather too poor to admit of their being worked in a profitable manner in the old-fashioned way.

In Lu Yun Fu Prefecture, gold, silver, lead, cinnabar, coal and iron are all found and worked after a fashion, but not profitably of late.

In P'ing-Yûeh Chou, a district almost equal to a Prefecture in matters of Government, and larger in extent than some Prefectures coal and iron abound as well as sulphur, saltpeter and lead with some silver has been worked.

ELECTRIC PROPULSION ON ELEVATED RAILWAYS.

Electric propulsion on a moderate scale has had for some time many examples throughout the country, and has amply vouched for itself within certain limits. The ordinary street-car, with a motor of 15 horse-power, is conceded a *locus standi* commercially; but any thing beyond this is tacitly voted visionary, and here the matter rests.

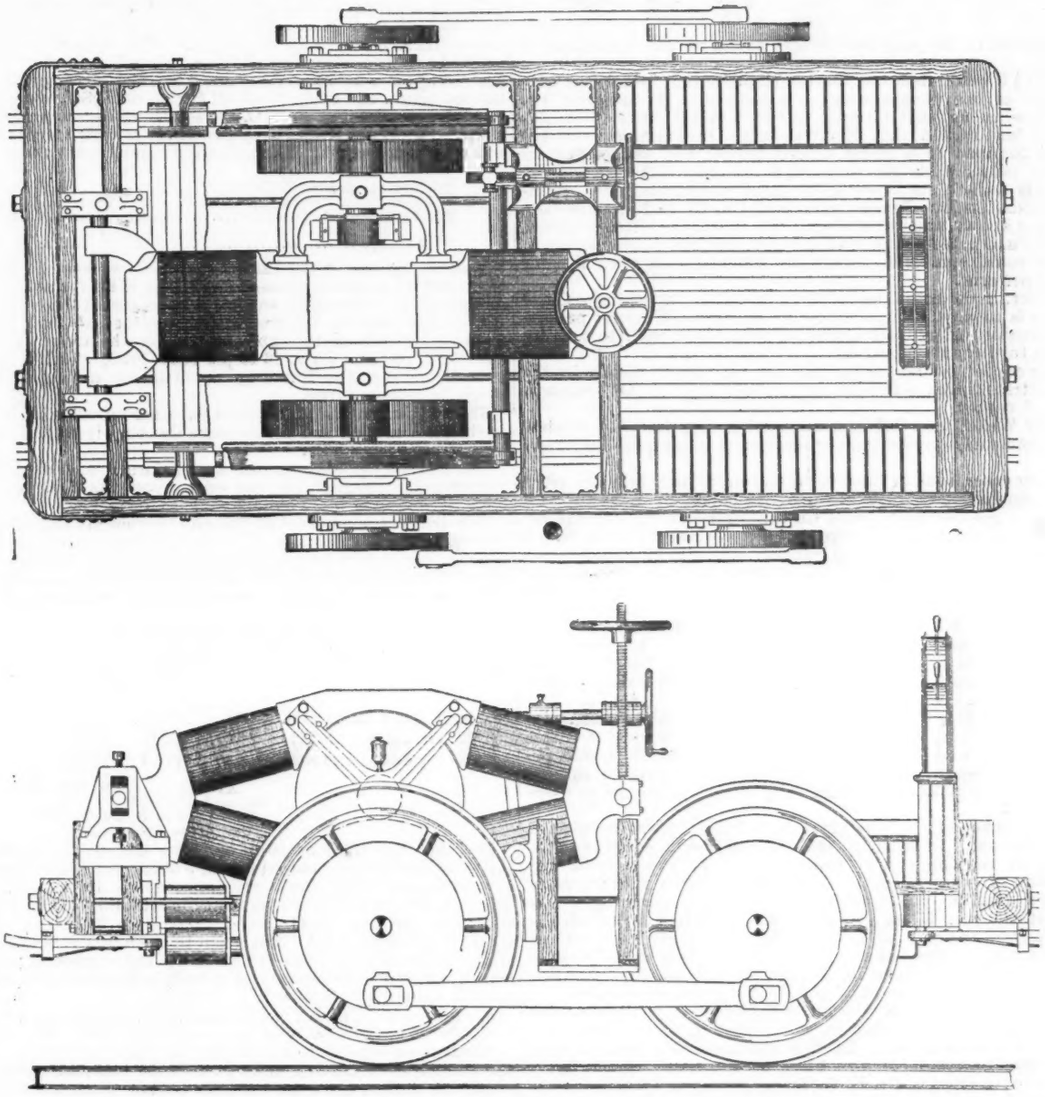
The Daft railway motors at Pittsburgh of 35 horse-power, with their remarkable tractive capacity and ability to pass over unprecedented gradients, should have corrected this misapprehension; but "it is a far cry" to the Monongahela, as regarded by the somewhat cockney self-sufficiency of the typical Gothamite, and their lesson has to a great extent been wasted.

On the night of November 26th, however, the scales dropped from Gotham's eyes and she saw the Daft Electric Railway motor Benjamin Franklin drawing an average train and load of passengers over the Ninth avenue elevated line, at the usual speed of the steam locomotives and exhibiting a handiness and mobility even superior to theirs.

A handsome vehicle, with little external mechanism visible, and small in comparison with the steam locomotives, weighing about ten tons, and with a wheel base of 5½ feet, and a probable ultimate capacity of 150 horse-power, does all that the steam engine of nearly double the weight can accomplish. The illustrations accompanying the text give a clea idea of the mechanical details of the "Franklin," and make plain the conservative influence upon the elevated structure of the use of locomotives of half the ordinary weight.

The question of adhesion will naturally occur here to practical railway men, and it should be more generally understood than it is, that where the track rails constitute part of the electric circuit the adhesion of the locomotive to them is at least doubled, and probably increased in much greater ratio. This is not due to any magnetic attraction, such as would be encountered in attempting to separate a magnet and its armature, but probably results from some molecular change in the contiguous surfaces of wheel and rail, due to the passing current, which has the effect of interlocking them more effectually.

While upon the subject of conservation of roadway, it is instructive to note the same influence, with respect to itself, which the Franklin design exercises. It would be difficult, if not impossible, to cite another instance of a locomotive of 150 horse-power whose mechanism might be inclosed in a parallelopipedon of $6 \times 5{\cdot}5 \times 6$ feet, a content of 198 cubic feet, or whose working bearings, large and small, only amounted to ten—as is the case with the "Franklin."



DAFT'S ELECTRIC MOTOR.

Another quality, viz., dispensing with all reciprocating, and making use solely of rotary motion, must operate most favorably in diminishing the rate of depreciation of the machine.

These merits, and the recognized economy of maintenance, single out electric propulsion as emphatically the one for use where the conductive problem does not assume too great proportion or encounter practical obstacles to its use apart from mechanical and electrical requirements.

The basic economy of the system lies in the recognized wastefulness of small, especially locomotive, engines which rarely give a horse-power for less than 9 or 10 pounds of coal. It is a simple matter to-day to obtain a horse-power from a stationary compound condensing engine for 2 or even 1½ pounds of coal, and it becomes well worth while to submit to the discounts, at the outside not over 33 per cent, incident to the conversion of mechanical power into current and *vice versa*, and conductive resistance, when the ratio of costs of a horse-power, *at the place where it is used*, may be fairly stated as respectively 3 and 1, for steam and electrical power.

HAMPE'S METHOD OF DETERMINING Cu_2O IN METALLIC COPPER.

BY FRED P. DEWEY.

Having occasion to make a series of determinations of Cu_2O in copper in some suites of specimens in the National Museum, representing the process of refining pig copper to tough pitch metal, the Hampe* method was selected as being the best so far proposed.

The method is based upon the reaction between Cu_2O and $AgNO_3$, discovered by H. Rose.† and consists in treating the material to be analyzed with neutral solution of $AgNO_3$ in the cold for several days, when, according to Hampe, the following reaction takes place between Cu_2O and $AgNO_3$; $3Cu_2O + 6AgNO_3 + 3H_2O = 4CuO, N_2O_5 3H_2O + 2CuN_2O_6 + 6Ag$, whereby two thirds of the copper is converted into an insoluble basic nitrate, and remains with the silver precipitated, while one third goes into solution as normal nitrate. On filtering off the residue and determining the amount of copper contained in it, we can easily calculate the percentage of Cu_2O in the metal. The following series of results, calculated on Hampe's formula:

	Cu_2O in Cu				
No. 1	0·136	0·140	2·542	3·862	8·209
No. 2	0·222	0·128	2·537	3·897	7·897

showed the method to be quite satisfactory as far as the agreement of duplicate goes.

Rammelsberg‡ investigated the matter slightly and found that only 28·80 per cent of the copper went into solution. He assigned the following somewhat unusual formula to the insoluble nitrate: $Cu_{10}N_6O_{35}$. Hampe§ has replied that Rammelsberg's investigation was too limited, being confined to a single determination, and proper precautions were not taken, while his own work was very elaborate and extended, and his deductions based upon many determinations. Rammelsberg used pure Cu_2O; Hampe used both Cu_2O‖ and metallic copper containing a known amount of Cu_2O, but with the latter material the amount of Cu_2O present was so small that the unavoidable errors of determination would completely mask the difference between 28·8 per cent and 33·33 per cent.

Since, however, in the actual use of the method for determining Cu_2O in copper there is always a large excess of uncombined copper present which might possibly affect the reaction, it seemed desirable to take up the subject for further investigation.

That the free copper influences the reaction is readily shown by the fact that the filtrate from the residue of Ag and $H_6Cu_4N_2O_{12}$ contains much nitrate of copper.

More recently Wells¶ in a different connection has fully established the Hampe formula as representing the reaction between pure Cu_2O and $AgNO_3$.

In all ordinary cases, such as the determination of Cu_2O in tough pitch metal, the determination of Cu_2O in the native copper of Lake Superior by Monroe,** and the test cases, using Cu containing Cu_2O, of Hampe, mentioned above, the unavoidable errors of the work are so great that it is immaterial whether the constant of solution is 28·8 or 33·33, but in the case of the series I had under investigation, where in one sample 8 per per cent of Cu_2O was found by the Hampe constant, such a difference could not be tolerated.

For the purpose of this investigation, therefore, a series of samples was prepared corresponding exactly with the material to which the method would be applied; that is, metallic copper containing Cu_2O, but containing a large amount of Cu_2O. It was necessary that the samples should contain nothing else.

A tolerably pure $CuSO_4$ was dissolved in hot water till a strong solution was obtained; it was, however, neither boiling nor saturated. This solution was cooled with agitation, and a crop of small crystals obtained. These were separated from the mother liquor, redissolved, and the operation repeated twice. The final crop of crystals gave an absolutely pure $CuSO_4$.

A solution was made of the pure crystals, and the copper precipitated by the electric current. In order to obtain the copper in suitable form, the plan used in refining copper commercially by the current was adopted. A strip of ordinary sheet copper was coated with paraffine wax, and then graphite was sprinkled on it; this prepared strip was used as the first cathode. When a thin film of copper had deposited, the strip was taken from the bath, and the film of pure copper removed, the coating of wax making this quite easy to do. The thin sheet of pure copper was then used as the cathode, and the electrolysis of the solution continued, until a suitable amount of copper had been precipitated.

In this way some 200 grams of absolutely pure copper were prepared.

This pure copper was next melted in a scorifier, in a gas muffle, and allowed to absorb O from the air. In this operation the greatest care had to be exercised to avoid contamination of the metal, especially by Fe. I am greatly indebted to Dr. H. G. Torrey, assayer of the United States Mint at New York, for making these fusions for me with such great care that only small amounts of Fe could be found in the metal after fusion.

55·853 grams of the pure metal were melted in a scorifier and allowed to absorb O until it had covered itself with the melted oxide; the resulting button, freed as much as possible from the melted oxide, weighed 45 grams.

Drillings from this button were crushed to an approximately uniform size, thoroughly mixed, marked off into squares, and samples for analysis made up by taking some from each square.

0·8318 gram were dissolved in HNO_3, converted into sulphate, and the copper precipitated by two Bunsen cells, yielding 0·8162 gram copper, or 98·12 per cent.

2·0795 grams treated in this way yielded 2·0400 grams copper, or 98·10 per cent. In the solution after the precipitation of the copper from the latter were found 0·00028 Fe = 0·013 per cent.

2·7428 grams, determining the amount of copper going into solution, as well as that made insoluble by treatment with $AgNO_3$, yielded a total of 2·6918 grams copper = 98·14 per cent.

The average of these three copper determinations is 98·12 per cent, adding to this the Fe, we have 98·135 per cent; subtracting this from 100, we have 1·867 as the percentage of O present. 1·867 per cent O = 16·67 per cent Cu_2O. We have therefore the composition of this material:

	Per cent.
Cu	83·317
Cu_2O	16·670
Fe	00·013
	100·00

For the Cu_2O determination absolutely pure $AgNO_3$ was dissolved in H_2O, using 100 c. c. H_2O to 3 grams $AgNO_3$. The Cu containing Cu_2O was weighed out, and the cold solution added, using 200 c. c. or 6 grams $AgNO_3$ for each gram of the material. For the first few hours the mixture was repeatedly stirred, after which it was allowed to stand, with occasional stirring, for three to four days, being kept in a cool place all the time.

The residue, consisting of basic nitrate of copper and metallic silver, was filtered and thoroughly washed. It was then treated with quite dilute H_2SO_4, avoiding an excess. This dissolved the copper, and, owing to its fine state of subdivision, a small portion of the silver also. The solution was filtered, evaporated, the silver precipitated by HCl, filtered again, and evaporated till fumes of H_2SO_4 were given off. The residue was taken up by H_2O, the solution filtered, and the copper precipitated by the battery, using two Bunsen cells, coupled zinc to zinc, and carbon to carbon. The following results were obtained:

	Per cent.
2·7081 grams gave 0·3507 Cu=	12·95
2·7428 grams gave 0·4355 Cu=	15·88
2·1279 grams gave 0·3106 Cu=	14·59
Average	14·47

Multiplying this by the Hampe constant, we have 24·44 as the per cent of Cu_2O that should be present according to his formula, but the direct oxygen determination shows only 16·67 per cent to be present.

If we assume that all the copper present as Cu_2O in the metal was transformed into the insoluble nitrate by the action of the $AgNO_3$, we have 14·47 per cent Cu = 16·29 per cent Cu_2O, which is sufficiently close to 16·67 per cent, as found by the O determination, to warrant the assumption as being true.

Thirty grams of the above material were mixed with an equal weight of the pure copper, and the mixture thoroughly melted, when it was removed from the muffle.

The method of examination was enlarged and slightly modified in certain points suggested by the work upon the first sample, with the hope of obtaining more closely concordant results.

The drillings were crushed fine and thoroughly mixed, then the whole was spread out and marked off into twelve squares, and four of these squares were taken for each analysis. Especial attention was given to securing uniformity in the samples weighed out, since some of the differences in the first set of results are due to differences in the samples taken.

The silver separated by the reaction was determined, and the iron remaining in the solution after the separation of the copper was also determined. The following results were obtained:

Sub. taken.	Insol. Cu.	Sol. Cu.	Fe.	Ag ppt.	Total Cu. Per cent.	O. Per cent.	Fe. Per cent.	Insol. Cu Per cent.
3·0846	0·3406	2·6976	trace.	9·4538	98·496	1·504	trace.	11·042
3·3337	0·3768	2·9062	.....	10·1969	98·509	1·491	.....	11·300
3·2479	0·3521	2·8479	0·00007	9·9700	98·525	1·475	0·002	10·840
				Average	98·507	1·493	.....	11·06

Per cent. Per cent.
1·493 O = 13·33 Cu_2O
11·06 Cu = 12·455 Cu_2O.

Dividing the total amount of silver precipitated, 29·6207 grams, by the total amount of material taken, 9·6662 grams, we have 3·0643 grams as the amount of silver precipitated by 1 gram of the material. Theoretically, 1 gram of a mixture containing 86·67 per cent copper add 13·33 per cent Cu_2O should precipitate 3·1544 grams silver, thus showing a deficiency of 0·0901 gram in the amount of silver precipitated, which indicates that 2·645 per cent of the copper entered into the reaction without precipitating a corresponding amount of silver. Expressed atomically we have:

Cu present as Cu_2O	11·837 ÷ 63·4 = 0·1867	4·477
Cu not precipitating silver	2·645 ÷ 63·4 = 0·0417	1

While these results are not as close as could be desired, yet considering the difficulties in the case arising out of the fact that all the experimental errors are thrown upon the 1·493 per cent of O, they show that for every 4Cu in the Cu_2O entering into the reaction, one Cu did not reduce its corresponding amount of Ag. Taken in connection with the discovery of nitrate of copper in the filtrate from the silver and basic nitrate, these figures clearly establish the reaction as follows:

Reaction on treating copper containing Cu_2O with $AgNO_3$ in neutral solution.

$$4Cu_2O + Cu + 6AgNO_3 + 6H_2O = 2H_6Cu_4N_2O_{12} + CuN_2O_4 + 6Ag$$

Five grams of the first fusion were mixed with 55 grams of the pure copper and thoroughly fused. Treated in the same way as the second sample, this material yielded the following results:

Sub. taken.	Insol. Cu.	Sol. Cu.	Fe.	Ag ppt.	Total Cu. Per cent.	O. Per cent.	Fe. Per cent.	Insol. Cu. Per cent.
3·2626	0·2471	2·9801	0·000490	10·3304	98·915	1·070	0·015	7·58
3·5278	0·2781	3·2092	0·000455	11·1430	98·890	1·097	0·013	7·88
3·3826	0·2906	3·0479	0·000560	10·6036	98·873	1·110	0·017	8·77
				Average	98·893	1·092	0·015	8·08

Per cent. Per cent.
1·092 O = 9·75 Cu_2O
8·08 Cu = 9·10 Cu_2O

The composition of the material is therefore:

Per cent.
90·235 Cu
9·750 Cu_2O
0·015 Fe
100·000

* Zeit. f. Berg-, Hütten-u. Salinen-Wesen, 1873, Vol. XXI., p. 218.
† Pogg. Ann., Vol. CL., p. 513.
‡ Ber. Deutsch. Chem. Ge., 1877, p. 1780.
§ Zeit. f. Anal. Chem., Vol. XVII., p. 127.
‖ Hampe's Cu_2O always contained CuO.
¶ H. L. Wells and S. L. Penfield. Gerhardite and Basic Cupric Nitrates, the chemical work by the former. Am. Jr. Sci., Vol. XXX., p. 56.
** Trans. A. I. M. E., Vol. VIII., p. 414.

Performing the same calculations upon these figures as in the preceding case, we have :

Silver precipitated by 1 gram of material.

	Grams.	
Calculated	3·2217	
Found	3·1531	
Deficiency	0·0686	
0·0686 Ag = 2·01 per cent copper not precipitating Ag		
Cu present as Cu_2O	8·058 ÷ 63·4 = 0·1366	4·309
Cu not precipitating silver	2·01 ÷ 63·4 = 0·0317	1

The conclusion arrived at from these figures is that, when copper containing Cu_2O is treated with a neutral solution of $AgNO_3$ in excess in the cold, all the Cu_2O is converted into the insoluble basic nitrate $H_6Cu_4N_2O_{12}$.

METAMORPHISM OF ROCKS.

Written for the Engineering and Mining Journal by Carl Henrich, M.E.

The metamorphosis of the sedimentary rocks has always been one of the most interesting fields of speculation for geologists. Heat and pressure have always been assigned as the two main factors in causing the radical change in sedimentary rocks, which we see exemplified in our gneisses, mica schists, syenitic and granitic rocks.

Granite and gneiss are really the same rock, only the one is considered an eruptive rock, while the other is looked on as a metamorphic stratified rock. In the general acceptance of these terms, this would mean that granite has been melted, while gneiss has been changed from the original clay slates by heat and pressure, without melting. But if we really melt granite, we do not obtain granite again on cooling, no matter how slowly, but either a glassy or homogenous earthy *slag*.

I have always wondered that I have not been able to find in geological works the simple explanation of the causes of metamorphism of rocks, which has always seemed to me the most plausible and at the same time the most simple and universally applicable of all explanations.

As far down into the depths of our earth's crust as we have gone in our mines or with boreholes, we have found water permeating the rocks. The question has presented itself to me: "How far is it possible for water to permeate the rocks in depth, and under what conditions must water exist at these lower depths?"

It is generally conceded that the temperature of our earth increases with depth. I do not need to go into the reasons for this assumption. Our experience points to the fact. This increase in temperature with depth, as far as our observations go, is not the same everywhere, but we may assume that for every 100 feet of depth below the surface the temperature increases 1 degree C., so that at 10,000 feet we would have the temperature of 100 degrees C., or 212 degrees F., the temperature of boiling water under a pressure of one atmosphere, or of 30 inches of mercury, or of 34 feet of water. But if we consider the 10,000 feet of rock filled with water, the water at a depth of 10,000 feet below the surface will not be under the pressure of one atmosphere or under an hydraulic pressure of 34 feet, but of 10,000 feet of water (not considering the friction in the rocks, which on the one hand would make the pressure less, but on the other hand would also oppose a greater resistance to any conversion of the water into steam). Thus we should have at 10,000 feet depth water heated to 212 degrees F., but very far from its boiling point under the pressure it would have to sustain. We will see how things would be at 30,000 feet and 50,000 feet respectively.

At 30,000 feet we should have 300 degrees C., or 572 degrees F. temperature. According to the formula given in Haswell's pocket book, page 575, to compute the pressure of steam in inches mercury, we add 100 to the degree F., divide this sum by 177, and the sixth power of the quotient will be the pressure.

Thus we have $P = \left(\frac{672}{177}\right)^6 = 3{\cdot}8^6$ (closely) = 3010 inches mercury, or 3411 feet of water. We see, therefore, that the hydraulic pressure even at 30,000 feet depth is more than eight times greater than is sufficient to prevent water of a temperature of 572 degrees F. from boiling, and such a temperature the water in circulation at such depth in our earth's crust should have.

At 50,000 feet depth we have as the temperature 500 degrees C., or 932 degrees F., and as the pressure of water boiling at this temperature, or what is *very closely* the same, the pressure of steam of this temperature:

$P = \left(\frac{1032}{177}\right)^6 = 5{\cdot}83^6 = 39{,}265$ (closely) inches mercury, or 44,500 feet of water.

We see that we have at that depth still hydraulic pressure enough to keep the circulating water of a temperature of 932 degrees F. from boiling, but it is *near* its boiling point and under the enormous pressure of about 3000 atmospheres.

The interesting experiments of Mr. Walthère Spring, of Liége, make it very problematical whether any solid body, no matter how strong, could retain its solid nature under a pressure of 3000 atmospheres at a temperature of 932 degrees F. But not considering this part of the subject at present we see, that even if a rock could retain its solidity at a depth of 50 000 feet, there is probably none of its constituent parts which would not be soluble in water superheated to 932 degrees F. And such water, we have just seen, can exist very well, and very likely does exist at a depth of about 50,000 feet below the surface.

But we need not go so far below the surface as 50,000 feet. The water existing in circulation at a depth of 30,000 feet, with a temperature of 572 degrees F. and under a pressure of 100 atmospheres, or 1470 pounds per square inch, will be able to dissolve nearly every component part of our rocks, and the metamorphism of our rocks is more likely to be due to the agency of this superheated water, down to a depth of about 51,000 feet, in the neighborhood of which depth water would be boiling under a pressure of about 3600 atmospheres.

At 51,700 feet depth the temperature would be 962 degrees F., or about 517 degrees C., and water would require a hydraulic pressure of 52,880 feet of water to keep it from being converted into steam. We may therefore assume 50,000 to 51,000 feet as the lowest limit below the surface to which water circulation exists, and we may be quite sure that none of our known rocks would be able to withstand the metamorphic action of water, superheated to that degree.

I think experiments and researches into the chemical action of enormously superheated water on the different rocks would throw much needed light not only on the metamorphism of rocks, but also on the origin and formation of our ore-deposits, and probably of our coal-beds as well.

MANUFACTURE OF RUSSIAN SHEET IRON.*

There appears to be much misunderstanding in reference to the manufacture of sheet iron in Russia, and questions are frequently asked the writer: "What are the secrets connected with it?" "How is it made?" "Could admission be obtained to the iron works in the Urals, where this iron is made?" It is difficult to understand why such questions should be asked by persons versed in the literature of iron and steel, for Dr. Percy wrote a very excellent and accurate monograph on the subject a number of years ago.

Not having had the opportunity of personally visiting the Russian iron works in the Urals, Dr. Percy's paper was compiled from data furnished him by a number of persons who had actually visited these sheet-iron works. Since it has been my good fortune to have the opportunity of seeing some of these works in the Urals but a short time ago, I will, at the risk of telling an old story, briefly describe the process of manufacture as I saw it.

The ores used for the manufacture of this iron are mostly from the celebrated mines of Maloblagodatj, and average about the following chemical composition : Metallic iron 60 per cent, silica 5 per cent, phosphorus from 0·15 to 0·06 per cent. The ore is generally smelted into charcoal pig-iron and converted into malleable iron by puddling or by a Franche-Comté hearth. Frequently, however, the malleable iron is made directly from the ore in various kinds of bloomaries.

The blooms or billets thus obtained are rolled into bars 6 inches wide, ½ inch thick, and 30 inches in length. These bars are assorted, the inferior ones "piled" and re-rolled, whilst the others are carefully heated to redness and cross-rolled into sheets about 30 inches square, requiring from eight to ten passes through the rolls. These sheets are twice again heated to redness and rolled in sets of three each, care being taken that every sheet before being passed through the rolls is brushed off with a wet broom made of fir, and at the same time that powdered charcoal is dexterously sprinkled between the sheets. Ten passes are thus made, and the resulting sheets trimmed to a standard size of 25 by 56 inches. After being assorted and the defective ones thrown out, each sheet is wetted with water, dusted with charcoal powder and dried. They are then made into packets containing from 60 to 100, and bound up with the waste sheets.

The packets are placed one at a time, with a log of wood at each of the four sides in a nearly air-tight chamber, and carefully annealed for five or six hours. When this has been completed the packet is removed and hammered with a trip hammer weighing about a ton, the area of its striking surface being about 6 by 14 inches. The face of the hammer is made of this somewhat unusual shape in order to secure a wavey appearance on the surface of the packet. After the packet has received ninety blows equally distributed over its surface it is reheated and the hammering repeated in the same manner. Some time after the first hammering the packet is broken and the sheets wetted with a mop to harden the surface. After the second hammering the packet is broken, the sheets examined to ascertain if any are welded together, and completely finished cold sheets are placed alternately between those of the packet, thus making a large packet of from 140 to 200 sheets. It is supposed that the interposition of these cold sheets produces the peculiar greenish color that the finished sheets possess on cooling.

This large packet is then given what is known as the finishing or polishing hammering. For this purpose the trip hammer used has a larger face than the others, having an area about 17 by 21 inches. When the hammering has been properly done, the packet has received 60 blows equally distributed, and the sheets should have a perfectly smooth, mirror-like surface. The packet is now broken before cooling, each sheet cleaned with a wet fir broom to remove the remaining charcoal powder, carefully inspected, and the good sheets stood on their edges in vertical racks to cool. These sheets are trimmed to regulation size (28 by 56 inches) and assorted into Nos. 1, 2, 3, according to their appearance, and again assorted according to weight, which varies from 10 to 12 lbs. per sheet. The quality varies according to color, and freedom from flaws or spots. A first-class sheet must be without the slightest flaw and have a peculiar metallic gray color, and on bending a number of times with the fingers, very little or no scale is separated, as in the case of ordinary sheet iron.

The peculiar property of Russian sheet iron is the beautiful polished coating of oxides ("glanz") which it possesses. If there is any secret in the process, it probably lies in the "trick" of giving this polish. As far as I was able to judge, from personal observation and conversation with the Russian iron masters, the excellence of this sheet iron appeared to be due to no secret, but to a variety of conditions peculiar to and nearly always present in the Russian iron works of the Urals. Besides the few particulars already noted in the above description of this process, it should be borne in mind that the iron ores of the Urals are particularly pure, and that the fuel used is exclusively charcoal and wood. Another, and equally as important consideration, lies in the fact that this same processs of manufacturing sheet iron has been carried on in the Urals for the last hundred years. As a consequence, the workmen have acquired a peculiar skill, the want of which has made attempts to manufacture equally as good iron outside of Russia generally less successful. It is difficult to understand what effect the use of charcoal powder between the sheets as they are rolled and hammered has upon the quality. It is equally as difficult to understand the effect of the interposition of the cold finished sheets upon the production of the polished coating of oxide. The Russian iron masters seem to at-

* Paper by F. Lynwood Garrison, Journal of the U. S. Association of Charcoal Iron Workers.

tribute the excellence of their product more to this peculiar treatment than to any other cause. One thing is quite certain, there is no secret about the process, and if the Russian sheet iron is so much superior to any other, it is due to the combination causes already indicated.

KAURI GUM INDUSTRY.

In our recent editorial summary of the New Zealand Government Mining Statistics, we referred to the large value of and rather anomalous position of Kauri gum, being classed under the head of minerals. We take the following interesting account of the industry from the *Oil, Paint and Drug Reporter:* Near the west coast of the North Islands, says Mr. Ralph Robinson, we found here and there a noble kauri, the Dammara australis, one of which measured upward of 32 feet in circumference. The largest known specimen in the colony measures about 72 feet in circumference, reaches a height of 80 feet without a single branch, and is estimated to have taken about two thousand years to grow.

There were many other trees in an advanced state of decay, covered with parasites, which gave them a very weird appearance. Hillsides covered with tree ferns, Cyathæa medullaris (Maori name—Punga), hundreds or perhaps even thousands standing closely together, with here and there a nikau palm with its pinkish flowers or red berries attached to the base of the leaves. The umbrella and scented ferns were also in abundance. The first half of our journey being completed at a place known as Big Muddy Creek, but on this occasion a small stream of very clear water, we halted and soon had a supply of hot tea and a fair supply of solids as lunch. The other half of the journey was very like the first half, until we reached the west coast with its rocks and boiling surf as far as the eye could see. It is common here on such excursions either to sleep out in the open air or to make use of an uninhabited gumdigger's hut or disused whare, not always the most desirable abode, as in many cases you are brought in contact with too many bedfellows in the shape of fleas. But Kare Kare has its idle saw-mill and workmen's empty huts, in one of which we took up our abode. Our cooking utensils were of the simplest description, tin cans (billies) and a few preserved meat tins playing a very important part. It was here we met with a camp of gum diggers and had the opportunity of gaining most of the little information here given relative to the Kauri gum industry. They go out in parties of three or more, carrying with them their spades, spears and bags, or they may have left their spades in the bush the night before. They usually went to their work between seven and eight o'clock in the morning, returning again about four o'clock in the afternoon, bringing with them what gum they had got. Friday was usually clearing up day, that is, they sorted and scraped their gum and bartered it in return for stores to the caretaker of the saw-mill, drawing the balance in cash or check before going to town. The store-keeper in his turn sold it to the gum merchant.

There are two kinds of gum fields, the summer and the winter. It is usual to work on the ridges, that is, the higher ground, during the winter months, because then the rain softens the hard, clayey ground and makes the labor much lighter; but in summer, when the ridges become too hard and the low lying swamps sufficiently dry, they transfer their operations to them. The gum is found much nearer the surface on the ranges than in the swamps, being only a few inches below the surface, and sometimes even projecting above, whilst in the swamps it may be found to a depth of several feet, the soil of the higher ground having been washed away with the heavy rains and deposited in the swamps, burying the gum deeper each successive year. The spear is a sharp-pointed steel rod with a wooden handle, and this is thrust down into the earth to ascertion if gum is present. If gum is proved to be present, then digging commences and the whole spot dug over until they suppose they have got all the gum out. It usually occurs in very irregular, rough pieces, about the size of a hen's egg, looking like a piece of very rough clay. This, when the outside is scraped off with a pocket-knife, is the Kauri gum usually met with in commerce, and worth about 35s. per cwt. on the spot. The smaller pieces are only washed and dried, and do not bring nearly such a good price. As a rule the scrapings are not saved, not being worth more than 20s. for a large sackful. They are used for lighting fires and making fire lighters. The gum fusing and burning soon sets the sticks and logs on fire, the gum giving off a white smoke and aromatic smell. Sometimes very large pieces, a cwt. or more, of transparent and almost colorless gum are found near the decayed root of a tree, probably the gum of the original tree. This brings a very much higher price, and is used for making personal ornaments. It is easily worked with a knife into any shape, and polished with a soft rag and kerosene oil. At times large masses of the gum may be found exuding from the living tree, but this gum is not so good for varnish making as the fossil gum. Three or four thousand men are usually engaged in digging the gum, and can earn in districts where the gum is fairly plentiful 30s. to 40s. a week. As the cost of living is very small they could easily save money; but, being cut off from all civilization whilst at work, they speedily spend and waste all their savings when they go to town. The gum is also found in considerable quantities, but of dark color, in the coal deposits, showing the antiquity of the kauri forests. There was 4920 tons of gum exported from Auckland in 1886, the value of which was £257,653, being at the rate of rather less than £2 12s. per cwt. The gum was dearer then than now, and there is the cost of packing, sorting, warehousing, carriage from the gum fields, and other expenses to be added to the first cost. The kauri gum industry is confined to the North Island, as it is only in the north that the kauri pine grows; thus the unemployed of Auckland are not so badly off as those in the south, always having the gum fields to fall back upon as a last resource; a last one on account of the hardships to be gone through, especially when there is a wife and family, and because an inexperienced digger may be a long time before he finds gum enough to find him with food. A very large portion of the kauri forests having passed into the hands of a syndicate, it is very probable the gum digging will be regulated, and in all likelihood the price of the gum will advance.

Photographing the Bessemer Converter Flame.—We are indebted to Mr. P. Barnes, of the Jones and Laughlin Steel Works, Pittsburg, Pa., for a very interesting photograph of a Bessemer converter, taken at those works in the night, during a blow, by the light of the Bessemer flame only. We are not aware that the completeness of the intense white light of this flame, even to its actinic power, has been demonstrated in this way hitherto. Mr. Barnes has not furnished details as to the time of the operation; but we presume that it took place at the climax of the carbon stage, when the light is strongest. The photograph was taken by Messrs. Gratton Bros., of Pittsburg.

Aluminum Bronze.—A commission has been appointed, says *Industries*, by the Austrian Government to report upon various types of rifles and materials for the barrel. Among the materials tested was aluminum bronze, manufactured by the Swiss Metallurgical Society according to the Herault process. The great advantage of this bronze over steel is its power to resist atmospheric influences. A rifle with a barrel of aluminum bronze and one with a barrel of steel were laid into the gutter of a roof, and left there for several weeks. The steel barrel was rusted all over and useless, whilst the bronze barrel was hardly affected at all, and the rifle could be fired without even cleaning the barrel.

Electric Propeller.—The first of a fleet of electrical power boats, we learn from our English exchanges, destined for public use on the River Thames, was recently launched from a yard at Chiswick. The boat is intended to carry eighty passengers; her length is 65½ feet, beam 10 feet, displacement 12½ tons, and speed according to the regulation of the traffic on the Thames by the Conservancy Board, six miles an hour. The machinery and storage cells are placed below deck. The boat carries 200 E. P. S. accumulators, and two 7½ horse-power motors drive twin three-bladed propellers made by Thorneycroft & Co. The center of the boat carries a cabin with lavatories, dining-tables, etc. Imisch & Co., Kentish Town, were builders.

Important Telephone Litigation.—The suit of the Bell Telephone Company vs. the Wallace Telephone Company for a perpetual injunction comes up for argument on Monday, the 3d of December, in the Circuit Court of the United States before Judge Wallace. The testimony has all been taken on both sides and the briefs will be filed on Monday. The Wallace Company present to the court for the first time the "phonetic telegraph patents," issued to Royal E. House in May, 1868, or eight years previous to the Bell patents. It is claimed that the House phonetic instrument is said to be a superior telephone, and experts say that the Bell instrument is an infringement, not only on the mechanical construction, but on the undulation of the current.

Brick Paving.—A good system of brick paving seems to be in use in Cumberland, Maryland. The bricks used are made by Thomas Maxwell at his fire-brick works at Williams, on the Pittsburg & Connellsville Railroad, and are constructed from the refuse clay not suitable for regular fire-bricks. They are both hard and tough. They are laid endwise, with broken joints, in sand. Afterwards they are pressed down with a heavy roller and boiling tar poured over them so as to make a compact mass as well as to exclude the water. A layer of sand is thrown over the tar before cooling. A very smooth, solid roadbed is the result, and it is comparatively noiseless. This style of pavement seems to have given satisfaction in the other cities where used, notably Wheeling.

Piedrahita's Telegraphy without Battery.—Señor Piedrahita, an electrician of Bogota, has patented a telegraphic instrument which he claims will revolutionize telegraphy, as it works without batteries. The government appointed a committee of experts to examine into the merits of the machine. In their first report they say: "On the 7th of October we proceeded outside the city and placed the new apparatus in connection with the telegraph to the city, and without a battery we held communication with the main office. On October 16th we practiced another test, and sent messages over a wire 600 meters long, which was hung on posts without insulators, and some portions of which were allowed to trail along the ground. Once our machine was in order we sent messages over this wire in Spanish, French, and English, and they were received without difficulty. The strength of the current received from us was tested and it showed a density of 400 ohms, equal to a distance of seven and a half leagues, and over this range we could have communicated had our wires stretched that distance.

Liability of a Purchaser for the Value of Stolen Government Timber.—In the United States Supreme Court at Denver, on the 23d ult., the case against A. H. Danforth, General Manager of the Colorado Coal and Iron Company, on an indictment for illegally cutting and causing to be cut timber from public land for the use of the company, came to a sudden termination after the prosecution had closed. John M. Waldron, attorney for defendant, moved the court to instruct the jury to return a verdict of not guilty, for the reason that there was no evidence showing that defendant was guilty. The court granted the motion, and in his ruling intimated that the timber purchased, which was taken from government land and possibly from private land, was purchased by the buyer, who is liable for the value of the timber on a civil suit, whether he knows or not that it was government timber at the time he bought it. To be proven guilty it must be shown the timber was cut on government land by direction of the person accused. There is nothing to show that in this case. The parties who took this timber were acting independently of the accused, and no case could be made against him.

The Chignecto Ship Railway, Nova Scotia.—This undertaking, to which we have previously referred, will be the first of its kind, and will probably prove how far it is possible to apply the principle of transport of vessels on dry land. The estimated cost is $5,500,000, and the contract has been let to Messrs. John J. Meigs & Sons, of London. At each end of the railway there will be a dock with a hydraulic lift, and vessels will be raised and lowered forty feet, the difference between sea and railway level. The dock at the Bay of Fundy end will be 600 by 300 feet, and the one at Chignecto will be 800 feet long, exclusive of the lifting dock, which is 200 feet in length. More than half the estimated cost is for the docks. The distance between the two points is about seventeen miles, and the plans call for four steel rails, 110 pounds to the yard, over which the ship bearing cradle

supported on about 200 wheels, will travel. It is stated that the saving in distance to be effected is about 600 miles, and that an equally important advantage will be gained in the avoidance of dangerous navigation by adopting this route. The undertaking is virtually one of the Dominion Government, as an annual subsidy of $170,603 for twenty years has been granted to the company constructing the work, and by means of this aid the financial arrangements have been made for its execution.

Petroleum as Fuel for Locomotives.—The latest movement toward utilizing liquid fuel for locomotives has been made upon the Great Eastern Railway, England, not, however, by the Urquhart system, which was developed upon the Grazi-Tsaritzin Railway, South Russia, and afterward experimented with upon the Pennsylvania Railway. The locomotive superintendent of the Great Eastern took a new line and used liquid fuel as auxiliary to and not as a substitute for coal, and while making provision for replacing a large amount of coal by liquid fuel he has left the engines fitted with his apparatus fully available at any moment to work with coal alone if desired. The supply is by two injectors inserted through the rear water space, each fitted with a ring jet for inducing a current of air. In working on the system a thin fire is kept on the grate, and to assist in keeping the grate covered with a very thin fire, lumps of chalk are placed on the grate when starting for the day. With coal only, the evaporation was at the rate of 7·16 pounds of water per pound of coal, while with the coal and oil it was 8·91 pounds per pound of combined fuels. The system has also been applied to a furnace in a steam-hammer shop and a Cornish boiler in a printing office. Various kinds of liquid fuel have been used, and the apparatus appears capable of dealing with any of the ordinary marketable qualities. It also burns the tar, the refuse product of the Pintsch gas manufacture.

Colliery Accident at Aveyron, France.—There has befallen the coal-mining district of the Aveyron, in France, says Mr. Geo. G. André in the *Colliery Guardian*, one of those accidents which happen from time to time to show us that our boasted progress in knowledge is after all more in appearance than in reality, since it is of very little avail in averting danger. The district is that in which the rioting arising out of the Decazeville strike occurred some time ago, the precise locality of the explosion being the St. Barbe pit at Campagnac. In this case there is every reason to believe that a sudden irruption of gas took place. The mine was known to be fiery, and every care was observed to avert danger, by minute daily inspection, the rigorous enforcement of rules drawn up with a view to insure safety under the conditions prevailing in that locality, and the use of safety lamps. The inspectors on the morning of the day on which the accident happened found no gas. Yet, soon after they had left the workings, an explosion of extreme violence occurred, causing death to some forty-two men and destruction to a large portion of the workings. Here there could be no question of a dust explosion, for the explorers who made up the rescue party found the roads so full of explosive gas that they had to grope their way forward with the greatest caution. Against these sudden outbursts, there can be no effective protection till we light our mines exclusively with electric lamps.

Antediluvian Footprints.—Professor Bickmore, in his lecture on "The Period of Reptiles and Mammals," in the Museum of Natural History, says the New York *Tribune*, presented on a screen illustrations of the footprints of one of the amphibians of the coal period. The illustration was a drawing from the great slab of blue stone which belongs to the museum, and was taken from the stone quarry at Turners Falls, Mass. The animal itself, Mr. Bickmore explained, was one of those which roamed in great numbers along the Connecticut valley during the carboniferous period. This one had left its footprints in the mud, and the impression having been subsequently filled with sand, the cast was preserved when the clay became hardened into stone.

From fossils of the animal, which have been obtained in other portions of the valley, it appears to have had an elongated body about 14 feet long on four legs. It moved mainly on the hind feet, the forelegs being shorter, and lived partly in the water and partly on the banks of the stream. At that time and until a later period in the age of mammals, the lecturer showed by the drawings of the coast survey, the coast of New York extended fully 100 miles into the ocean south of its present line. The ocean steamers of to-day in approaching the Narrows follow the old channel of the Hudson River, which, previous to the subsidence of the land, as shown by the sea-soundings, flowed into the sea through a deep valley and over a steep cliff of great height, and must have formed a magnificent cataract.

Life of Steel Rails.—As an indication of what good steel rail of the old fashioned quality ought to stand, says the *Engineering News*, there was laid in 1871-2, on the New York, Pennsylvania & Ohio Railroad, 109·43 miles of Ebbw Vale and Dowlais steel. At the end of 1879, after sustaining about 15,000,000 tons in average trains of 400 tons, or after 7 years of wear, there was left 109·24 miles, or practically all of it. At the present time there is still some 20 miles of this steel in use on main track after sustaining probably 50,000,000 tons in 17 years of service, and most of the remainder has been removed to put in side track, very little of it having been scrapped. *Engineering News* says: "Where are the rails that will show such service now-a-days? They are not rolled. We doubt if there is a single 100-mile lot of rails seven years old in any part of the country, under a traffic of 2,000,000 tons or over, which can show 99·8 per cent of the rails still in service, yet the cost of manufacturing equally good rails to-day would probably be not more than $5 or $10 per ton more than the wretched stuff which is now usually sold as rails, and which, one may safely say, would be dear at half the price of the better article. The great lack is an *effective* mode of preliminary inspection for physical qualities. If we had that, the quality of rails would speedily improve, but no one seems able to supply it."

[All of which is a good deal more emphatic than correct.—ED. E. AND M. J.]

Determination of Sulphur in Commercial Irons and in Sulphides Decomposable by Acids—Dr. L. L. de Konick.—In 1870 the author published a process for the determination of the sulphureted hydrogen given off by sulphureted irons on treating them with hydrochloric acid or dilute sulphuric acid. This process consists in condensing the sulphureted hydrogen in a series of three small washing-bottles containing a neutral solution of silver nitrate at two per cent, in collecting the precipitate of silver sulphide and determining the sulphur. This determination is effected by treating the precipitate with bromine in presence of water, filtering off the silver bromide, and precipitating the sulphuric acid formed with barium chloride. The barium sulphate formed is very pure, being produced in a liquid free from fixed matters. Latterly the author has sought to simplify the process by substituting mercury for silver; the mercury forming, with bromine in excess, a soluble and volatile product, the advantages of the original process would be retained, and the filtration and washing of the precipitate of silver bromide would be avoided. To this end he absorbs the sulphureted hydrogen in a mixed solution of mercury cyanide and ammonium chloride. This mixture readily absorbs the sulphureted hydrogen, giving a black flocculent precipitate which is easily collected on a filter and washed. On treatment with bromine and water it dissolves rapidly and completely, especially at a slightly elevated temperature, yielding sulphuric acid and mercury bromide. This process has been carefully verified and found strictly accurate.

Deep Spring at Saratoga.—The Seltzer Spring, located on Spring avenue, was developed by Dr. Haskins less than three years ago. The drill was put down to the depth of 500 feet. At this depth an abundant supply of water was found flowing from a crevice in the rock bottom. Recently, to assure himself of the depths of the spring, Prof. Oscar Brunler, under whose charge a plant is being established for liberating and storing in liquid form the carbonic acid gas, sounded it with a line and plummet; but instead of resting at 500, the weight sank the whole length of the line, 900 feet. Other soundings have since been made, the weight used being a piece of inch gas pipe filled with lead, and weighing 34 pounds, until a depth of 3300 feet has been reached, and yet without touching bottom or any obstacle. No further soundings will be made until instruments expressly designed for the purpose can be procured.

Professor Brunler admits it as possible that the line and weight could have been carried away by some powerful current, but he holds to his original belief of the existence of a subterranean sea of greater or less extent, and that there is undoubtedly some connection between it and the water of the ocean. In other words, that Saratoga is over a vast water-filled cavern, the roof of which is about 500 feet thick. He also thinks it probable that at a given depth and temperature carbonic acid gas may be found in a liquid form. The specific gravity of the liquid gas is about nine degrees lighter than water, which would readily cause the water to climb 300 feet above the ocean level.

BOOKS RECEIVED.

[In sending books for notice, will publishers, for their own sake and for that of book-buyers, give the retail price? These notices do not supersede review in another page of the Journal.]

A Treatise on Mine Surveying. By Bennett H. Brough, Associate of the Royal School of Mines, and Instructor in Mine-Surveying at the Normal School of Science and Royal School of Mines. Published by J. B. Lippincott Company, Philadelphia. Pages, 302.

Microscopical Physiography of the Rock-Making Minerals. An aid to the microscopical study of rocks. By H. Rosenbusch. Translated and abridged for use in schools and colleges by Joseph P. Iddings. Illustrated. Published by John Wiley & Sons, New York. Pages, 333. Price, $5.

DIVIDENDS PAID BY MINING COMPANIES DURING NOVEMBER AND FROM JANUARY 1st, 1888.

NAME OF COMPANY.	Paid in Nov.	Since Jan. 1.	NAME OF COMPANY.	Paid in Nov.	Since Jan. 1.
Aspen, Colo.	40,000	40,000	Jay Gould, Mont.	10,000	182,000
Atlantic, Mich.	.....	120,000	Little Chief, Colo.	.....	20,000
Alturas, Idaho.	.....	112,500	Mammoth, Utah	10,000	40,000
Bos. & Mon. Cop., Mont.	200,000	400,000	Mary Murphy, Colo.	.....	35,000
Bunker Hill &Sull, Idaho	.....	130,000	Montana Lt., Mon.	.....	412,500
Caledonia, Dak.	8,000	8,000	Morning Star, Colo.	.....	25,000
Calumet & Hecla, Mich.	.....	1,500,000	Mt. Diablo, Nev.	.....	40,000
Carlisle, N. M.	.....	160,000	North Belle Isle, Nev.	.....	200,000
Central, Mich.	.....	70,000	N.Y. & Honduras R., C.A	15,000	60,000
Colo. Central, Colo.	.....	68,750	North Star, Cal.	.....	100,000
Confidence, Nev.	.....	174,720	Ontario, Utah.	75,000	825,000
Cons. Cal. & Va., Nev.	108,000	1,188,000	Original, Mont.	.....	3,000
Copper Queen Con., Ar.	.....	140,000	Osceola, Mich.	.....	150,000
Crescent, Utah.	.....	18,000	Parrott, Mont.	36,000	144,000
Daly, Utah.	37,500	450,000	Pittsburg, Cal.	.....	29,860
Deer Creek, Idaho.	.....	10,000	Plymouth Cons., Cal	.....	80,000
Dunkin, Colo	.....	90,000	Poorman, Colo.	.....	10,000
Eureka, Nev.	.....	87,500	Quicksilver, Cal., Pref.	.....	290,250
Franklin, Mich	.....	120,000	Quincy, Mich.	.....	360,000
Garfield, Nev.	.....	25,000	Sherwood, Mo.	.....	3,000
Golconda, Idaho	.....	120,000	Sierra Buttes, Cal.	.....	15,312
Granite, Idaho	.....	10,000	Sierra Nevada, Idaho	.....	10,000
Granite Mountain, Mont	.....	1,600,000	Silver Mg. of L. V., N.M.	.....	25,000
Hale & Norcross, Nev.	.....	224,000	Standard, Cal.	.....	50,000
Hecla Cons., Mont	15,000	165,000	Swansea, Colo.	.....	3,000
Homestake, Dak.	25,000	275,000	Tamarack, Mich.	.....	440,000
Hope, Mont.	.....	50,000	Viola Lt., Idaho	.....	93,750
Hubert, Colo.	.....	69,500			
Idaho, Cal.	23,250	31,000	Total	802,750	11,582,642
Iron Silver, Colo.	.....	200,000			

PATENTS GRANTED BY THE UNITED STATES PATENT-OFFICE.

PATENTS GRANTED NOVEMBER 27TH, 1888.

393,357. Blower for Boiler Furnaces. Theodore H. Champion, Minneapolis, Minn.
393,373. Electric Motor. Fred J. Keller and James W. Carnes, Massillon, Ohio.
393,375. Feed-Water-Heater. J. Thomas Lee, Mattoon, Ill.
393,409. Furnace. Fred Wild, Denver, Colo.
393,415. Hydrocarbon Furnace. John S. Andrews, New York, N. Y.
393,440. Rock-Crusher. Joel B. Low, San Francisco, Cal.
393,454. Lead-Bath Apparatus for Working Ores. Andrew M. Shields, North Temescal, Cal.
393,483. Feed-Water Heater. Ronello F. Pratt, Revere, and Charles D. Wainwright, Medford, Mass.
393,520. Automatic Pump. Francois Romain, Grenoble, France.
393,553. Process of Manufacturing Steel Direct from the Ore. Matthew Graff, Pittsburg, Pa.
393,554. Process of Reducing Iron Ores. Matthew Graff, Pittsburg, Pa.
393,559. Hydraulic Mining Apparatus. Joshua Hendy, San Francisco, and Orange M. Loveridge, Weaverville Cal.
393,565. Pump. William Keast, Russell Gulch, Colo.
393,567. Rotary Engine. Charles Ludvik, Brooklyn, N. Y.
393,578. Production of Zinc Chloride, etc. Leonard Paget, New York.
393,672. Apparatus for Obtaining Chlorine. Ernest Solvay, Brussells, Belgium.

PERSONAL.

Mr. Louis Janin, Mining Engineer of San Francisco, is at present in New York.

Mr. Hugh W. Gabbett, of London, England, interested in mining matters, is at present in New York.

Mr. Oliver Durant, is about to leave Wallace, Idaho, for his home, Boston, Virginia, where he will spend the winter.

Mr. Geo. D. Roberts is at Santa Rita copper mines in New Mexico. He will return here about the middle of the month.

Mr. Arthur Macy, until recently Superintendent of the Silver King Mining Company of Arizona, is now in New York.

Mr. W. W. Parshall succeeds C. E. Palmer as general manager of the Grand View Mining and Smelting Company, of Rico, Colorado.

Mr. Andrew D. White, ex-president of Cornell University, N. Y., is still in England, where it is now his intention to remain through the coming winter.

Prof. J. F. Kemp, of Parnell University, delivered a lecture on Colorado, before the Long Island Historical Society, in Brooklyn, N. Y., on the 27th ult.

The offices of *The Town and Country Journal* in Sydney, N. S. W., have been destroyed by fire. The offices are said to have been the finest in Australia.

E. Carl, of Devon, whose death has been announced in London, was the chairman of the Candeleria Water Works and Milling Company of Nevada, a London incorporation.

Professor M. C. Vincent, the English mining expert, who visited the Black Hills, Dakota, last spring, to report on the Harney Peak tin mines, is here again on a visit to these mines.

Mr. Thomas Weir, Manager of the A Y and Minnie mines, of Leadville, Colorado, has resigned in order to accept the management of the Granite Mountain Mining Company, of Montana.

Ex-Mayor Edward Cooper, James C. Bayles, David Williams, Benjamin F. Church, James A. Burden, Joseph C. Platt and others have incorporated the Scientific Society of New York.

Mr. George W. Sessions, who used to be Secretary of Bodie and Mono mining companies of California, is here on his way from Europe to San Francisco. He is handling an Alaska Territory property on the German market.

Mr. Patrick Kirwin, Superintendent of the Best & Belcher and Gould & Curry mining companies, of Nevada, has gone to Mexico to inspect certain mines. In his absence Mr. D. B. Lyman will direct the work at the company's mines.

General John Newton has resigned his position of Commissioner of Public Works, of New York City and Mr. D. Lowber Smith has been appointed his successor. It is stated that State Engineer John Bogart, Secretary American Society of Civil Engineers, declined the Commissionership.

Mr. Hamilton H. Salmon, the well known importer of muriate of potash and agent of the German Sales Syndicate returned from Europe on the White Star steamer Celtic last Sunday. While on the steamer, Mr. Salmon was thrown violently down a stairway by a sudden lurch of the ship, and was quite seriously injured.

Mr. Charles W. Hilton has been engaged as manager of the Spiral Tube Company, of East Orange, N. J. Mr. Hilton is one of the many professional gentlemen who has received his appointment through the services of the ENGINEERING AND MINING JOURNAL, which publishes free every week the list of positions vacant.

Capt. John Daniell, Superintendent of the Tamarack, Tamarack Junior, Osceola, Kearsarge and other Clark-Bigelow copper mines at Lake Superior, is in Boston to confer with the officers of those companies upon matters relating to the various properties. Among other matters to be talked over is the project for sinking two shafts in section 11 of the Tamarack property. Several of the Tamarack people are earnestly in favor of making an early beginning, and possibly it may be concluded to start the work next spring.

Mr. T. V. Powderly has been re-elected Chief of the Knights of Labor at their recent meeting at Indianapolis, Ind. The New York *Times* says that in declining to accept more than $3000 a year for his services, though the salary is $5000, Mr. Powderly shows that he differs from that rather too numerous class of individuals who are labor reformers for revenue only. Among the other officers elected is one miner, Mr. John Costello, who has been vice-president of the Western Pennsylvania Miners' Association, and was afterward president for four years. This body is now amalgamated with National Assembly No. 135.

The engineer officers of the Navy have formed the "American Society of Naval Engineers," with the following staff officers: President, Chief Engineer N. P. Towne; Secretary and Treasurer, Assistant Engineer R. S. Griffin; Members of Council, the above named officers and Past Assistant Engineers G. W. Baird and A. M. Mattice, and Assistant Engineer Emil Theiss. The object of the society is to promote a knowledge of naval engineering, by the reading, discussion and publication of papers on professional subjects. Engineer officers and persons in civil life, who were formerly officers of the corps, are eligible as members, and persons in civil life whose knowledge of engineering is such that they can co-operate with the naval engineers in the promotion of professional knowledge are eligible as associates.

Mr. John B. Garrett, Third Vice-President of the Lehigh Valley, is to have supervision of the accounting and traffic departments of the new Lehigh Valley Railroad system, which will operate, after December 1st, all the lines owned and controlled by the Lehigh Valley Railroad Company, and Mr. Rollin H. Wilbur, assistant to Second Vice-President, is to have especial charge of the assignment and distribution of the locomotive and car equipment of the system. General Eastern Superintendent H. Stanley Goodwin is to have charge of the roadway and transportation departments of the main line, branches, and leased lines south and east of Lackawanna and Bloomsbury junction, including the Mountain Cut-Off, Pleasant Valley branch, and the Mount Morris Canal. Vice-President Charles Hartshorn, who is stationed in Philadelphia, will have charge of the finances of the companies and of the general executive business in the absence of the president. Mr. Robert H. Sayre, Second Vice-President, will have charge of the engineering, construction, and transportation departments of the new system. He is located at South Bethlehem, Pa.

INDUSTRIAL NOTES.

The first furnace of the Cameron Iron and Coal Company, at Emporium, Pa., went into blast on the 21st inst. Three others are to be built.

The large wire factory of Messrs. Morris & White, on Commonwealth avenue, Boston, Mass., was entirely destroyed by fire on the 24th ult.

The Pioneer Iron and Manufacturing Company, of Birmingham, Ala., has let the contracts for building an additional 100-ton furnace, and actual work has commenced.

The Alabama Rolling Mill Company is putting in a new Siemens gas furnace at its rolling mill at Gate City, Ala., and as soon as this is completed another larger one will be put in.

The Union Iron and Steel Rolling Mill Company, of Kansas City, Mo., has received a charter. This is the company recently organized to remove the Henderson rolling mill from St. Louis to Kansas City.

An Imperial Iradé was promulgated recently ordering the exemption from payment of customs duty of all machines and apparatus of public utility which may be imported into Turkey from abroad during the next ten years.

The Lady Enslay Furnace Company will add to its new furnace just about completed, at Florence, Ala., four large boilers, another blowing engine and another hot-blast stove. The furnace is 75 × 17 feet, and will soon go into operation.

At the rolling mill of Von Willer & Co. there has been erected a pulsometer which is the largest at work in Vienna. With a steam pressure of 60 pounds this pulsometer is capable of raising 4 tons of water per minute to a height of 26 feet.

The Oil Route, the Toledo Southern road, has one of its engines fitted up with an oil burner, and intends to make a thorough test of using Ohio crude oil for fuel. If the test is successful it will make another opening for the product of this field.

Mr. Randolph Brandt, of New York, manufacturer of the Selden patent packing, has made arrangements with the Utah & Montana Machinery Company, of Salt Lake City, to handle the "Selden Packings" in Utah. They will carry in stock a full assortment of all sizes.

Messrs. Charles Colne and E. H. Carmick, of New York, have begun suit against the Gatling Gun Company for $350,000 damages for an alleged refusal of the company to carry out a contract with them for the sale of the Gatling patent to the French Government.

Representatives of mills belonging to the Western Cut Nail Association on the 27th ult. met at Wheeling, Va., and adopted a plan for establishing a uniform rate for the product and put a check to the cut-throat business now practiced. They will have a guarantee fund as a pledge of good faith from each mill.

Messrs. Scranton & Cook, of New York, agents for the sale of the Venström Magnetic Separator, have sold to the Lackawanna Coal and Iron Company one of their machines, 24 inches × 30 inches. One has also been sent to Marquette, Mich., to demonstrate what it is capable of in handling the ores of the Lake Superior region.

At the request of the Board of Revenue Dr. Thurston, the Superintendent of the Madras Museum, is visiting the several electrical establishments in Europe, with a view to select for use at the various pearl fisheries in India an electric globe light that would operate in 20 fathoms of water. The want of such an appliance has long been felt, and the work at the pearl fisheries at present has to be confined to pearl banks situated in less than twenty fathoms of water.

All the property of Brown, Bonnell & Co., at Youngstown, Ohio, including rolling mills and furnaces, was levied upon on the 15th of November by the sheriff to satisfy 52 executions, aggregating $800,000. There is no intention of forcing a sale of the property, the levy being made purely to prevent the executions from becoming dormant. The plant will continue to run under the management of Receiver Fayette Brown

The Cowles Electric Smelting and Aluminum Company, of Lockport, N. Y., has published a descriptive pamphlet of the alloys of alluminum and silicon as produced in the Cowles electric furnace. This is a useful hand-book for manufacturers and others requiring information on the subject and as a work of reference with regard to everything concerning aluminum bronze, aluminum brass, ferro-aluminum, aluminum tin-bronze and siliconized copper and silicon bronze.

It is stated that the Pennsylvania Railroad Company has organized a corporation with a capital stock of $6,000,000, to build a line of a dozen large steamships, six for freight, and six to carry both freight and passengers, to run between Duluth and Buffalo; that contracts have been made with shipbuilders on the Delaware for building the boats, which, however, will be put together at some point on Lake Erie; that the vessels will cost about $325,000 each; and that they will have a capacity of over 3000 tons each and will be the largest vessels and best on fresh water.

They are to be fitted with twin screws and propelled by triple expansion engines. The passenger ships will be built to make the round trip from Duluth to Buffalo in eight days. None of them will be in commission, it is said, before 1890.

At the time of the formation of the Salt Trust, the price of common salt at the salt works was as low as 60 cents per ton. The Lancashire alkali makers contracted for this year's supply at the price of about $1 per ton at the works. It was recently said that the price for next year would be raised to $2.40, but it appears that the Trust has agreed to supply the alkali makers throughout the year 1889 for $1.82 per ton at the works. The alkali trade in England consumed 731,000 tons last year, or more than was taken for domestic uses. The Trust is restrained by threatened competition from abroad, for German salt is now offered in England at about $2.40 per ton delivered.

The North Chicago Rolling Mill Company has given notice of a 15 to 20 per cent reduction in the wages of employés in the blast-furnace at South Chicago, Ill. It is understood that the men took a decided stand against the reduction, and placed the matter in the hands of the Executive Board of their national organization. Several interviews occurred between the company and the officers of the Executive Board. The interviews eventually resulted in the two sides agreeing to place the matter in the hands of a board of arbitration and an umpire, whose decisions will be binding upon both employers and men. The arbitrators have not as yet been selected, but it is understood that Mayor Roche will be asked to act as umpire.

The six-inch cast steel gun, manufactured by the Pittsburg Steel Casting Company, of Fittsburg, Pa., and to which we referred in previous issues, will be tested at Annapolis, December 5th. The same grade of gun made by the Standard Steel Company has been sent to the Annapolis proving ground. The experiments with it will depend upon the results obtained with the gun manufactured by the Pittsburg company. All of the eight-inch guns have been tested and sent to New York, and will be placed on board the new cruiser "Chicago." The recent experiments have given great satisfaction. A muzzle velocity of 2000 feet per second was obtained, the pressure in the chamber being between 15 and 16 tons to the square inch. This is the standard regulation and velocity and service pressure. The estimated range of the guns is about eight miles. The new 12 and 16-inch guns, intended for the battery of the new coast defense vessels, are now being designed here. They will be among the heaviest ordnance in the world. The cast steel forgings will be made by the Bethlehem Steel Company, but they will be finished at the navy yard here.

CONTRACTING NOTES.

Our list of machinery and supplies wanted will be found on page xi. Manufacturers of machinery, engineers and contractors should consult our directory of "Contracts Open" on page xii. This week, proposals are invited for the following new contracts: No. 1193, Construction of System of Water-Works; No. 1194, Building Reservoir, Dam, and Tunnel; No. 1195, Dredging; No. 1196, Extension of Piers and Repairs on Lake Erie Harbors; No. 1197, Furnishing and Delivering Rock; No. 1198, Furnishing Stone; No. 1199, Furnishing Electric Lights; No. 1200, Supplying Portland Cement; No. 1201, New Croton Aqueduct Work; No. 1202, Aqueduct Work; No. 1203, Repairing Granite Seawall.

Messrs. Brown, Howard & Co., aqueduct contractors at Tarrytown, N. Y., have discharged all their men employed on the day staff of the aqueduct, to the number of about 900. The cause of the shut-down is owing to the firm refusing to make repairs in the tunnel on soundings made by the city engineers and experts appointed recently. The courts will have to decide whether the contractors or the city of New York shall finish the work.

GENERAL MINING NEWS.

Miners and prospectors who have not already done so, should at once commence the assessment work on their claims, to comply with the United States mining

laws. Only a few weeks more remain in which to do the work.

Shipments of iron ore from the mines of the districts mentioned below for the season up to and including November 21st, as reported by the Marquette *Mining Journal*, were as follows:

	Tons. 1888.	Tons. 1887.
Marquette, Marquette District	832,247	803,411
St. Ignace, " "	107,399	91,544
Escanaba, " "	823,700	862,799
" Menominee District	1,088,072	1,132,611
" Gogebic District	205,357	50,608
Ashland, " "	1,014,000	1,040,727
Two Harbors, Vermillion District	437,760	390,467
Total tons	4,508,535	4,372,167

ARIZONA.

GRAHAM COUNTY

MONTEZUMA CANAL COMPANY.—This company has been organized, with a capital stock of $10,000, shares $25 each. The purpose is to maintain, enlarge and extend the Montezuma Canal—which is situated in the County of Graham, and commencing on the south bank of the Gila River, at a point near the northwest corner of section 16, township 7 south, range 27 east G. & S. R. Mer., and about 2½ miles north of east from Solomonville, and ending at or near the Munson Cienega arroyo, or sand wash—for irrigating and motive purposes, to acquire water and water rights by purchase and location, to construct and maintain canals, ditches, flumes, dams and reservoirs for the purpose of conducting, storing and distributing water so acquired.

PIMA COUNTY.

PEERLESS MINING COMPANY.—The official report dated November 9th, shows that the production of ore from the stopes on the different levels continues regular in amount and grade, with breasts looking strong. Machinery running well at mill and crushing a regular amount of ore. Will soon make another shipment of bullion now in the assay office.

ARKANSAS.

PULASKI COUNTY.

KELLOGG MILLING AND MINING COMPANY.—This company has been incorporated at Little Rock, with a capital stock of $100,000, for the purpose of working the Kellogg silver mines, north of that city. J. G. Sandidge is president and C. T. Walker is treasurer of the company.

SEBASTIAN COUNTY.

Natural gas is reported to have been struck at a depth of 2700 feet three miles south of Fort Smith. According to press reports dated November 25th, the pressure registers 220 pounds to the square inch.

The Missouri Pacific Railroad Company has purchased coal lands, it is stated, and contemplate putting in machinery for mining coal as soon as its road is completed to Jenny Lind.

CALIFORNIA.

AMADOR COUNTY.

[From our Special Correspondent.]

The Bunker Hill, Keystone and South Spring Hill mines, of Amador City, are all running full, the recent rains furnishing an abundant supply of water for milling purposes for the winter any way. Just south of the South Spring Hill is located the North Star mine. A company of private individuals has been working that property for the past eight months, sinking a shaft 600 feet and running short drifts. About two weeks ago they struck the point of a very rich ledge going south. They are very much excited over the strike—too much so, I think—still it is hard to tell what they may develop. Any way, their prospects are good, and the strike enhances the value of adjoining properties.

AMADOR GOLD MINING COMPANY.—The company is pushing the work ahead in and about its mine, and it looks as if it expected to do something in the near future. The 60-stamp mill will soon be completed. When that is running we will soon see what they have in the way of pay rock. For the good of the county, I hope the ore may pay.

HECTOR GOLD MINING COMPANY.—This company, of Sutter Creek, owns the old Mahoney with a new name. This property has a 40-stamp mill, which in its day (10 years ago) was a first-class mill. It has been idle for six years and more, and, as the timbers in a mill decay faster when it is idle than when running, I should think it will be necessary to rebuild the whole mill very soon if they expect to run it. In former times, when the Mahoney was running full, we always understood they had plenty of ore, but it was very low-grade. I think the shaft is down 1000 feet. There is a good double hoisting engine at the shaft, and the ore is very conveniently run direct to the mill, a distance of about 300 feet. The best proof the ore will not pay, is the fact they closed the mine down while they had free water for their mill for more than half of the year. We have heard times without number during the past few years that the Mahoney was about to start up, but no *start* was made.

I can give you but little information of the true inwardness of the Hector Gold Mining Company. This new name was adopted when they tried to place the stock on the New York market I presume.

You in New York probably know as much about the trouble between the stockholders as we do here.

The Valuntine Brothers, who have controlled the property for a long time, live in San Francisco. We hear it said they made $50,000 out of the last operation, when they had a party go East and try and sell the mine for them. We have always felt some Eastern parties were badly swindled by that operation. It seems strange to me that Eastern parties will not try and inform themselves as to the value of mining properties here before they invest their money, not wait until they loose $50,000 or $100,000.

PLYMOUTH CONSOLIDATED GOLD MINING COMPANY.—Work has been resumed in a very small way. It really amounts to no work at all. They are hoisting water in the "Pacific" shaft during the daytime and in all probability it fills up at night as much as they take out in the day. Every one is anxiously looking for a change in the management of that fine property, as they feel then something might be done.

SUTTER CREEK MINING COMPANY.—The Sutter Creek mine has always been known here as the Iowa, and is owned by the Tibbett's family, of Sutter Creek. It is rather a small claim. I do not know just the size of it. They have a 10-stamp mill which they run part of the time. I understand they have bonded it to a party, retaining the right to work the mine for themselves while the bond runs. Think the party is East trying to place the stock. Some two or three years ago they had a small streak of very rich ore, which they took out. Since then their ore has been low-grade. For some months the supply of water has not been sufficient to allow them to run the mill, consequently very little has been done in the mine. The Tibetts family is quite confident the party to whom they have given the bond will finally succeed in selling the mine for them. It might be made quite a mine if money was spent upon it, but at present it does not amount to much.

WILDMAN.—This mine, also of Sutter Creek, which lay idle for some twenty years, was sold to an Eastern company about two years ago. Here is an example of what money will do for an old mine. They went to work and put up a new hoisting works, cleaned out the old shaft, built a ten-stamp mill, and now have every thing running in good shape with a 12-foot ledge of good ore at the bottom of the last sinking. The mine is now in a fair way of becoming one of the good paying mines of the county.

COLORADO.

ARAPAHOE COUNTY.

It is stated that arrangements have been made whereby works to use the Croselmire process for treating low-grade zinc-silver ores will be erected in Denver. Ground for the work will not be broken, however, before next spring.

BOULDER COUNTY.

PRUSSIAN.—This property was sold recently at sheriff's sale, and bought in by Major R. S. Whiteley. The mine will be started up by the new syndicate.

RECLUSE MINING COMPANY.—At a meeting of this company recently at Boulder, C. A. McKenzie was appointed as the company's agent to procure patents of mill site and other property.

SLIDE.—It is reported that operations will be resumed at this mine.

UTICA.—The litigation involving the possession of this mine, adjoining the Boston, has been settled, and the property has been secured by a Philadelphia company, which started in during the past week, cleaning out the working levels and preparing for an active campaign.

CHAFFEE COUNTY.

The Calumet iron mine near Salida and the Hot Springs iron mine, at the head of the San Luis valley, both owned by the Colorado Coal and Iron Company, are closed down.

SEDALIA.—This copper mine at Salida is shipping about 40 tons of ore a day. The ore is sent to Denver and sampled, after which it is transported to Newark, New Jersey.

CUSTER COUNTY.

GEYSER MINING AND MILLING COMPANY.—According to the Silver Cliff *Rustler*, this company has begun the working of some thirty assessments on the properties it owns in the Rosita camp.

DOLORES COUNTY.

A. P. Adams has bought the stamps and crusher at the Grand View smelter, and will soon start a concentrating and sampling works there. The Rico *News* states that a ditch will soon be commenced to take water from Silver Creek to the smelter, the survey having been made. Mr. Adams will shortly come East to purchase machinery.

FREMONT COUNTY.

UNITED OIL COMPANY.—The company with its new refinery and stills, is now in a position to refine over 1000 barrels daily, and the two new stills at the refinery were put in operation. Seven hundred barrels of petroleum were refined the first day.

HINSDALE COUNTY.

Mr. Stockder, Manager of the Vermont Mining Company, has gone to London to call a meeting of the board of directors of this company and the Lake City Mining Company. Operations will be resumed on the Vermont probably in June, next year.

LAKE COUNTY.

We condense the following from the Leadville *Herald-Democrat:*

AGASSIZ CONSOLIDATED MINING COMPANY.—The improvements which are now being made on the surface of the Wolfetone mine show that the company proposes to resume mining operations on a large scale after the first of next year. By that time the new sulphide mill will be completed and ready for operation.

IRON SILVER MINING COMPANY.—The Moyer mine of this company is at the present time doing better than it has ever done before since it was first opened. Shipments are now being made at the rate of 500 tons per month to the Boston & Colorado Smelting Company. The ore assays from 50 to 60 ounces per ton in silver and averages about $\frac{1}{10}$ of an ounce of gold, occasional lots assaying as high as $\frac{1}{10}$ of an ounce in gold.

LEADVILLE MINES, LIMITED.—The sheriff issued attachment suits against this company on the 24th ult., brought by Eaton & Carey for $467.49 and James Bowm for $400, and the following mines situated on Little Ella Hill, the Golconda, Kokoma, New Year and Jew, have been levied upon. In our issue of October 20th we referred extensively to the property of this company.

MIKE & STARR.—The returns from the first carload of ore shipped from this mine show that the lot assayed 37 ounces per ton in silver, 0·2 of an ounce in galena and 5 per cent copper. The copper in the ore brought about $7 per ton. The lot was shipped to the Holden Smelting Company. Some ore is now being taken out, and small shipments will probably be continued.

SMALL HOPES CONSOLIDATED MINING COMPANY.—The new McCormack shaft of this company has finally been sunk through the quicksand in which it has been for a month past, and the bottom is now in Weber grit, about 165 feet from the surface. The McCormack shaft is 5 by 10½ feet in size, timbered with square sets, except in the quicksand, where sawed cribbing has been used.

TIP-TOP.—The owners of this mine have decided to thoroughly explore that property. Considerable work will be done in the virgin ground of the upper contact, and the shaft is to be sunk to look for a lower contact. The Tip-Top is now making such a small amount of water that there is no shaft on East Fryer Hill that can be sunk with less difficulty than that. Developments in the Cora Belle-Bankok property give reasons to suppose that there is a second contact under this part of Fryer Hill. While this prospecting work is in progress shipments from the mine will be suspended.

LAS ANIMAS COUNTY.

The work has begun at Trinidad on building a new smelter, which is to be running within four months.

PUEBLO COUNTY.

PHILADELPHIA SMELTING AND REFINING COMPANY.—On account of delay in receiving some of the machinery, the works of this company at Pueblo will not be put in operation until the 10th of December. The company is buying large amounts of ore and now has about 10,000 tons in stock.

SAN JUAN COUNTY.

The Johnny Williams group of mines, consisting of the Victoria, Ajax and other claims, have been purchased by a Boston syndicate. Work will be commenced upon these properties at an early date, and it is the intention of the company to work them extensively all this winter.

BEATON SILVER MINING COMPANY.—This company has made arrangements to put in power drills early in the spring. The property will be worked all winter and the cross-cut to cut the vein 200 feet below the upper workings completed. The lower tunnel, which is now in 750 feet, will not be run until spring.

TOWER MOUNTAIN MINING AND MILLING COMPANY.—This company has commenced work again, and will keep a force of men on the mine all winter.

DAKOTA.

The party which has been organized to explore the coal-fields of the Grand River has started on its expedition. Tests have been made of the coal, which show, it is said, that it will make good coke.

PENNINGTON COUNTY.

Messrs. J. W. Brown, J. Mitchell, and E. Wilson recently made certain locations under the placer laws, near the Fanshawe ranch, about thirteen miles south of Rapid City, says the Deadwood *Pioneer*, which are likely to prove excedingly valuable. The locations are of clay banks, and the character of the clay, samples of which have been sent all over the country, has been pronounced by experts well adapted for making china ware.

KENTUCKY.

ELKHORN COAL, COKE AND IRON COMPANY.—This company has been organized with a capital of $2,500,000. The principal office is in Louisville, with branch offices in New York and Philadelphia. Mr. Charles F. Johnson, of Louisville, is the President; W. J. Horsley, of Pineville, is the Secretary and General Manager of the company. Most of the stock has been taken by New York and Philadelphia parties. The company has purchased 136,000 acres of lands and mineral rights on the Kentucky Union Railroad survey in Breathitt, Knott, Perry, and Letcher counties. The coking and cannel coal on this property is pronounced by Prof. Proctor to be as good, if not better, than any other in the United States. The coke-ovens and furnaces will be built and developments will begin at once on this property.

BELL COUNTY.

PINE MOUNTAIN IRON AND COAL COMPANY.—The company is completing several coke-ovens and is opening its mines. It has also disposed of all the coke it can manufacture, providing the quality is satisfactory, and in a few weeks the question will be solved. The Louisville & Nashville Railroad has completed its line to Pineville, and the Pine Mountain company has been actively at work improving its property at that place.

MARYLAND.

ALLEGHENY COUNTY.

BIG VEIN COAL COMPANY.—This company has purchased from the Consolidation Company and others 100 acres of land underlaid with the 14-foot vein along the line of the Cumberland & Pennsylvania Railroad, about three miles south of Frostburg.

An opening in this property will be made as soon as possible.

MICHIGAN.

PENINSULAR GOLD MINING COMPANY.—This company, to the organization of which we referred in our last issue, has merely taken an option on its property, instead of buying the fee. The price paid for the option is reported to have been $20,000, and if the company wishes to buy the fee to the land it will have to raise $150,000, that being the price at which it is held, it is said, by the owner.

COPPER MINES.

[From our Special Correspondent.]

ATLANTIC MINING COMPANY.—An extensive amount of exploring has been carried on during the past summer on Section 16 owned by the company. This work has now been discontinued for the winter, but will be resumed in the spring. A number of pits have been sunk and considerable trenching done. Several veins of both conglomerate and amygdaloid have been found, several of them carrying copper in small quantities; but nothing has yet been found that would pay to develop. At the mine everything is running along smoothly. The vein, if anything, is showing a little stronger in copper than for some time. Several improvements have recently been made at the rock-house in the way of changing the large rock breaker, so that they will crush the rock small enough to go direct to the mill without having to be run through the small machines. If these large rock breakers are found to do the work satisfactorily the small ones will be done away with.

CALUMET & HECLA MINING COMPANY.—The water in the old portion of the mine, which was closed down during the fire, has been lowered to the 34th level. There are now only five levels below 34 remaining to be pumped out, and as at these levels there has been no stoping done the openings are comparatively small, and it will only be a matter of a short time when the mine is entirely free of water. The shafts which were closed down through the fire have had to receive some attention in the matter of timbering, particularly Nos. 1 and 2 Hecla, and the man engine shafts, which were the ones in which the greatest amount of damage was done. Only a small amount of drifting remains to be done to connect Nos. 4 and 5 Calumet shafts at the 34th level. Nos. 9, 10, and 11 shafts at the South Hecla are down to the 14th level, and the drift at this point to connect the shafts will soon be holed. The Red Jacket shaft, which I have before written you is the name of the new vertical shaft, is now down from surface rising ninety feet. As soon as the permanent sinking plant is made ready, which will be in the course of a week or two, and will be capable of doing much heavier work than the temporary plant which has been in use so far, sinking will be carried on much more rapidly.

IRON MINES.

PENOKEE & GOGEBIC DEVELOPMENT AND IMPROVEMENT COMPANY.—The Colby mine is again under the control of this company, through the expiration of the lease of the parties who have hitherto held it.

NEVADA.

ELKO COUNTY.

The new concentrating works at Tuscarora were to start up on the 26th ult. on Nevada Queen ore. A total of fifty tons per day will be sent through the rollers and be concentrated.

TUSCARORA CONSOLIDATED MINING COMPANY.—A contract has been let for sinking a shaft on the ground of this company.

STOREY COUNTY—COMSTOCK LODE.

We condense the following from the Virginia City *Chronicle:*

ALPHA CONSOLIDATED MILL AND MINING COMPANY.—This company has virtually agreed to allow the Consolidated Imperial Mining Company to work its ground on the 500-foot level through the Alpha shaft, in consideration of the privilege given the Alpha Consolidated Company to work its ground on the 1200 level through the Yellow Jacket shaft. The south drift on the 500 level of Alpha is now within 20 feet of the Consolidated Imperial north line, and when it reaches that point it will be taken by the Imperial people and extended into their mine.

CHALLENGE MINING COMPANY.—At the annual meeting, held in San Francisco, November 15th, the following officers were elected for the ensuing year: A. K. P. Harmon, President; Joseph Newlands, Vice-President; J. H. Dobinson, R. D. Fry and William Norriss, Directors. C. L. McCoy was re-elected Secretary and W. E. Sharon, Superintendent. The secretary's financial statement showed an indebtedness of $4313.97, and the superintendent's report states that during the past year there has been extracted from the mine and shipped to the Brunswick mill for reduction 1476 tons of ore. He concludes by saying that the appearance of the mine is encouraging for an increased output of ore during the coming year.

CONSOLIDATED CALIFORNIA AND VIRGINIA MINING COMPANY.—The Morgan mill, which has a crushing capacity of 160 tons of ore every twenty-four hours, will start up on ore from this company on the 1st inst. This, with the Eureka mill, which has a capacity for crushing 260 tons, will enable a total of 420 tons daily, or 12,600 tons monthly, to be crushed. The California mill is now shutting down, as the water which supplies the power to run it is needed at the Nevada mill. After paying liabilities to November 21st, including the November dividend, the company has a surplus of $60,000 coin in the treasury. A bullion shipment of $64,856 was made on November 19th, which was the first on account of that month.

CROWN POINT MINING COMPANY.—Daily shipments of ore are made from this mine to the Santiago mill. This ore is what accumulated in 400, 500, 600 and 700 level explorations.

HALE & NORCROSS MINING CO.—This company expects to resume daily ore shipments to the Mexican mill about the 1st inst. The mill is now in full operation on ore on hand, which will be cleaned up by the above date. The Mexican has a complement of forty-five stamps, and these, with one half the complement in the Nevada mill, will give the company a total of seventy-four, representing a crushing capacity of 250 tons in twenty-four hours.

JUSTICE MINING COMPANY.—The new mill of this company is completed and will shortly begin to crush ore from the mine. About 3000 tons of good ore have already been accumulated while running drifts, etc.

OCCIDENTAL CONSOLIDATED MINING COMPANY.—A fine body of ore is being developed in this company's ground within fifty feet of the North Occidental, with every indication of making strongly into the last-named property. Arrangements are making whereby the Occidental Consolidated people will take charge of the North Occidental and assist in opening up that property.

WHITE PINE COUNTY.

MARTIN WHITE MINING COMPANY.—A contract has been let, and work is to be resumed. A queer phenomenon is connected with the working of the Martin White ore. The ore is very base, and it is necessary to roast the whole of it. During the roasting process no deleterious or disagreeable fumes are observable, yet, says the *Territorial Enterprise*, the hair and the beards of all the men engaged about the works are soon dyed a bright and permanent green. Even the eyebrows of the workmen are as green as grass. In scores of Nevada mines ores of various kinds are smelted and roasted, but at none of them is either the hair or beards of the workmen changed from their natural hue. It is said there is less arsenic in the ore of the Martin White than in that of any other mines. Arsenic has no such effect on the hair. White, light and sandy beards and hair take a grass green, whereas black or dark brown hair is dyed a deep bottle green. The hair is not injured by its change of color. It retains its original softness and strength.

NEW JERSEY.

MORRIS COUNTY.

MUTUAL IRON ORE COMPANY.—The company, of Jersey City, was declared insolvent by Vice-Chancellor Van Fleet on the 26th ult. Mr. Francis S. Emmons has been appointed receiver. The company started in 1882 with a capital of $100,000, John E. Andrews, of New York, being the president and principal stockholder. The mines are in Rockaway township, Morris County. They were worked at a loss of $13,000, and the company is said to owe its employés $1000.

NEW MEXICO.

GRANT COUNTY.

COLCHIS MINING COMPANY.—The company is now building a mill with a view to handling and treating ores at the least possible expense. The machinery is of the most approved kind, and the plan of the mill is said to be such that lifting and handling ores is almost entirely dispensed with. The ore bins are on a hill above the mill, and ores are delivered in the top of the mill by cars, which run over a tramway from the ore bins. In addition to the stamp batteries there is a Sturtevant mill for dry crushing, which will, when in operation, crush about the same quantity of ore as the stamps. It is expected that the plant will be in operation about February 1st.

The claims owned by this company, have been lying idle, or comparatively so, for years, little work having been done on them except the necessary assessment work to hold the claims.

DEEP DOWN MINING COMPANY.—The company, in which St. Louis parties are interested, has purchased Wagner's Atlantic mine at Pinos Altos. The Atlantic is on the same lead as the Deep Down. The Deep Down has not been in operation for a month, but both mines, belonging to the same company, will be started up shortly.

NEW YORK.

CHAUTAUQUA COUNTY.

According to report a gas well of great volume and force has been struck at Zoar. This find is said to be in an entirely new field.

NORTH CAROLINA.

M'DOWELL COUNTY.

Arrangements are now being made to open and work the quarry at Mount Ida, near Marion, which contains a gneissoid granite quarry of hard and uniform texture, and of desirable color, suitable for building and paving purposes, railroad bridges, monumental work, etc. The Charleston, Cincinnati & Chicago Railroad, which is being constructed, will cross the Western North Carolina Railroad at Marion and have its junction there. It will cut through valuable mineral deposits, and will run near to extensive quarries of marble, etc.

OHIO.

BELMONT COUNTY.

PITTSBURG & WHEELING COAL COMPANY.—The Pittsburg mine of this company, at Maynard, twelve miles north of Bridgeport, is now in full operation. Mr. Joseph M. Hamilton, for many years in charge of the mining department at the Top Mill in Wheeling, is now the superintendent, and is putting the mine in condition to largely increase the output from it when necessary. The mine is running full time when cars can be had.

PENNSYLVANIA.

The Brady's Run Fire Brick Company, at West Bridgewater, Beaver County, has abandoned its new well near the site of the works now in course of erection. It had reached a depth of 1160 feet and developed neither oil nor gas, the latter of which was sought. This is the third attempt made to discover oil or gas in quantity at that point, a well having been drilled to a much greater depth at the mouth of the run and near the highway, by a Rochester party many years ago. It proved a failure, and with these subsequent attempts is regarded as proving conclusively the absence of oil or gas in paying quantities in that neighborhood.

The well on the Yeager farm in Dutchman's Run, two miles east of Rochester, Beaver County, has reached a depth of over 1200 feet, but no oil or any favorable indications. The company intend going 2400 feet, if necessary, to test the matter, but the signs are said to grow more unfavorable as the drill progresses, and it is thought that the well will be abandoned soon, and another started on a little run, three miles northeast of the present one.

CONNELLSVILLE COKE AND IRON COMPANY.—The case of John Connerly against this company came up for trial at Uniontown November 23d. He is one of those who were injured in the West Leiseuring mine explosion in 1883 by inhaling after damp. Most of the cases of damage against the company were compromised, but several await the result of the Connerly trial, which is intended as a test case. The case seems to turn on the competency or incompetency of Mine Boss Jenkins.

COAL.

A convention of the river coal miners will meet in Monongahela City on the 1st inst., to take action in regard to the shut-down ordered by the River Coal Exchange to take effect that day, referred to in our last issue, and to adopt measures looking to the aid and co-operation of the Kanawha miners, who are threatened with a shut-down.

The coke shipments for October from the Connellsville region, as reported by the *Courier*, show a grand total of 29,725 cars, or a trifle over 1100 cars per day. It is beats the record of coke shipments in the region, and is an increase of about 50 per cent in the past five months, as the following figures will show:

1888.	Pittsburg.	West.	East.	Total.
June	4,900	9,460	4,800	19,160
July	4,000	10,700	5,860	20,560
August	5,350	12,450	6,650	24,450
September	5,270	13,916	6,140	25,326
October	5,900	17,900	5,925	29,725

It will be noticed that Western shipments have almost doubled since June, while those to Pittsburg and the East have only increased about 20 per cent.

A scale of wages for the Connellsville Coke region has been proposed by the Executive Board of the Miners' and Laborers' Amalgamated Association. It is based on a minimum price for coke of $1 35 per ton of 2000 pounds on board cars at ovens. When coke is selling at that price wages are to be as follows: Mining and loading room coal, 95c. per 100 bushels; mining and loading coal in wet places, $1.08; in headings and cut-through ordered by mining boss, $1.12; in wet headings and cut-through, $1.20; cagers, per run of 10 hours, $1.95; drivers in shafts and slopes, per run of 10 hours, $1.95; in drift mines, $1.85; dumpers and tipplemen, $1.65; roadmen, timbermen and horsebackmen, $1.05; firemen, $1.70 per turn; coke drawers, 54c. per 100 bushels charged; levelers, 9½c. per oven; car-forkers cars of less than 20 tons capacity, 95c.; more than 20 tons, $1.15.

The second provision of the scale demands that weigh-scales shall be erected on the tipples, or between the mouth of the mine and the tipple, at all mines in the region employing twenty men or more; these scales to be erected before the 1st of March next, and the wages for mining and loading coal and drawing coke based on the amount charged, shall be at the same proportionate for 2000 pounds as for 76 pounds by the present system of measurement, or 23 6 cents per ton of 2000 pounds for mining and loading room coal, and 13·9 cents per ton of coal charged for drawing coke. These wages shall be the minimum at all the works owned and operated by the company signing the scale, and for each advance of 10 per cent in the market price of furnace coke the wages of miners and coke drawers shall be advanced 5 per cent, and all other employés 4 per cent.

The scale stipulates the hiring of men by the company shall not be interfered with by the employés, nor shall the employés interfere in the discharge or employment of the company's officials. The companies, however, are to instruct their officials at the works to recognize the regularly elected committees of the employés with a view to settling any differences which may arise from the interpretation of the scale or in connection with their work or wages. The settlement of the "hump" question is promised by the scale, which provides that while the system of measurement lasts the wagons shall be loaded, just as measured by the mine inspector, level full at the face of the room, heading, rib, or cut-through. To insure safety against recklessness of inexperienced miners and to avoid the danger of explosions, it is made a provision of the scale that in mines where safety-lamps are used the lamps should be handed every night to a "lamp-man," who shall be an employé of the company, to be trimmed, cleaned and locked by him and given to the employés every morning. The scale is to remain in force until December 1st, 1889.

If no action is taken upon the scale at the coming mass meeting of the national Federation of Trades, to be held at Columbus, Ohio, on the 4th of December, it will not be presented to any of the operators until finally decided upon by the association at either the mass meeting or the convention.

ALTOONA FUEL COMPANY.—A charter has been granted to this company to mine anthracite and bituminous coal and manufacture coke. The capital is

$100,000, and the directors are F. H. Seely, of Pittsburg; Charles D. Baltzell, C. P. Wortnington, George A. McCormick and J. T. Baltzell, of Altoona.

LEHIGH COAL AND NAVIGATION COMPANY.—A semi-annual dividend of $1.12½ per share has just been declared. The company has a reserve dividend fund of $646,742, but President Harris is reported to have said that it was not necessary to encroach upon this fund, as the dividend was warranted by the increase in earnings.

PHILADELPHIA & READING COAL AND IRON COMPLNY.—East Franklin colliery, situated near Tremont, and operated by this company, which has been idle for some time, has resumed shipments, shipping via Cressona, instead of Pinegrove, as formerly. The company will shut down 18 colleries and run about 37 on three quarters time on the 1st inst.

SOUTH CAROLINA.

AIKEN COUNTY.

AIKEN MINING AND PORCELAIN MANUFACTURING COMPANY.—This company will hold a meeting at Aiken on the 17th inst., to issue $8000 of bonds to supply working capital, enlarge plant, etc.

YORK COUNTY.

MAGNETIC IRON ORE AND STEEL COMPANY.—This company, to which we referred in our issue of October 20th, is now opening its iron ore lands with a view to testing the deposits.

TENNESSEE.

HAMILTON COUNTY.

Press dispatches report that oil was struck on the 26th ult. at the depth of 1000 feet in a well being sunk in the Suquatchie Valley near Chattanooga.

TEXAS.

A good deal of dissatisfaction prevails among the miners of Western Texas, particularly in the counties of El Paso, Reeves and Jeff Davis, over the action of the Texas & Pacific Railroad Company in regard to granting mining privileges on the lands owned by that company along its line of road.

Most of the good mining districts of Western Texas are on Texas & Pacific lands, and, although many valuable mines have been discovered, there has been heretofore no opportunity given by the company for acquiring title to them.

Recently all Texas & Pacific land grants have been conveyed to an Eastern syndicate consisting of Charles J. Canda, Simon J. Drake and William Strauss, and they have issued a circular to miners and prospectors, stating that they are to consider applications for options or leases of mines or claims, already located or hereafter to be located on these lands.

A record of all applications, filed in the order of their receipt, will be kept by the agent, W. H Abrams, at Dallas. The terms of the proposed leases require the payment of a ground rent of $10 per year for two years and $50 per year thereafter, and also a royalty varying from 5 per cent on ore of the gross value of $30 per ton to 30 per cent on ore valued at $300 or more per ton. Lessees of claims are required to do at least 240 days' work yearly. Leases will not be made for over twenty years.

The circular and the conditions proposed do not give satisfaction among the practical miners, but are looked upon as being a serious drawback to the successful development of the mining resources of the western portion of the State. A royalty ranging from 3 to 30 per cent on the gross output of mines is considered to be out of all proportion to the profit that is possible in the business, but if the royalty named was put on the net profits it would not be objected to.

UTAH.

UTAH COAL AND IRON COMPANY.—This company has been incorporated by W. R. Swan, J. R. Middlemiss, Wm. Van Dyke and W. R. Williams, of Ogden; Wm. Fuller, of Salt Lake City, and W. W. Bishop, of San Francisco, with a capital stock of $2,000,000, shares of $10 each. The company's object is to handle coal and iron lands and ore, and manufacture coke, iron and steel.

BEAVER COUNTY.

The French company now operating in Copper Gulch, four miles east of Frisco, is now assisting in opening up the different copper deposits in Star, Beaver, Lake and Rocky districts. A small draft furnace is to be erected close by the Copper King mine in Star district to test and melt the ores. This mine has about ten men employed. Quite a number of copper claims will now be opened up, and the outlook is good for copper mine owners. James Barrett ships this week one car copper ore to the Mingo Company from the Moscow mine, Star district.

FOREIGN MINING NEWS.

CANADA.

PROVINCE OF ONTARIO.

[From our Special Correspondent.]

ALGOMA.—Among the new discoveries of auriferous lodes during the past month in this district, the abnormal fissures recently examined by the writer, near the Spanish River, on the Algoma branch of the Canadian Pacific Railroad, rank with the most important.

These locations, which are in the vicinity of railway communication, form part of the Huronion formation, consisting of diorite and Huronian slate, traversed by an abnormal series of parallel quartz veins, which are interlaminated by talcose slate wallings. These veins vary in width from 6 inches to 4 feet 6 inches, and show an aggregate width of 61 feet, the vein matter and slate interlaminations being compact. The veins lie at distances from 1 to 3 feet apart, and have a dip of 85 degrees, and run in concurrence with the stratification of the country, the direction being north 70 degrees west.

The vein matter appears to be highly mineralized, contains a small percentage of pyrites of iron and copper, but it may be estimated that the gold sulphurets are low and that most of the gold contained in this vast body of ore is free milling. Assays made of samples taken from the several openings on this series assay as follows by Professor Heys, of Toronto:

Gold per ton, 6 oz. 10 dwts. 16 grs., value $135.25; another assay from same openings, gold per ton, 1 oz. 3 dwts. 6 grs., value $24.10.

The veins from which these samples were taken are traceable for 2,000 feet, and the outcrop then disappears under a covering of vegetable or other superficial covering. From measurements taken, there is no doubt an immense amount of ore can be mined and milled at an enormous profit.

Dr. Selwyn does not regard this country as an auriferous one, giving his theory upon the basis that diorite is not a gold-bearing rock, but in many instances Dr. Selwyn can be shown by the writer gold projecting from the outcroppings of diorite, where, from exposure, the sulphuret has been decomposed by atmospheric action leaving a particle of pure metal behind in the rock. This is apart from the auriferous vein stuff altogether. In many instances in this district many of the rarer metals have been found in the diorite, notably in the shaft (No. 1) of the Vermillion mine, from which Mariner & Hokins, assayers, of Chicago, gave the following analysis: Copper, 28 per cent; nickel, 10 per cent; cobalt, 3 per cent; iridium osmium, 5 ounces to the ton; gold, 5 dwts. to the ton. The ore was of a dark blue color, irridescent, resembling bornite. Unfortunately it only existed in a "shoot" and was worked out at 22 feet from the surface, having yielded on the bank about 300 tons at most. There is undoubtedly a great future before Canadians if only they will develop the mineral resources of the north shores of Lakes Huron and Superior.

MEXICO.

MEXICAN MINERAL RAILWAY COMPANY, LIMITED.—This company, incorporated in London, invites applications for £75,000, in shares of £10 each, and £50,000 in 7 per cent debentures. The purpose is to construct and work a mineral railway of 13 miles, and conduit of 10 miles, to supply water power for mills which will serve the mineral district in the neighorhood of Palmarejo. The Palmarejo Mining Company guarantees interest and dividends for 21 years.

SOUTH AFRICA.

The exports of gold through Natal and the Cape in October amounted in value to more than £93,000. This is the largest yield recorded for one month since the discovery of the South African gold-fields.

THE BARBERTON AND KAAP GOLD FIELDS.—The Colonial office in London has published a report by the British Agent in the South African Republic, of a visit paid by him to the Barberton and Kaap gold-fields. The quality of reefs in the Kaap district, he states, varies very much, high grade ores and low-grade ores being found in close juxtaposition, and he is of opinion that gold mining there will not pay unless a means can be devised by which the low-grade ores can be worked with a profit. If, however, such means of working could be devised, the Kaap fields, which are undoubtedly gold-bearing over a vast area, would, he thinks, profitably support a population greater even than the Witwatersand gold-fields. The agent goes on to refer to several of the reasons why gold mining in the Kaap district has not in the past proved a paying enterprise. The fields, he says, have been worked without regard to scientific mining, and in many cases by incompetent managers. They have been crushed down by an undue proportion of venders' shares, and in almost every case the working capital has been too small to even partially develop the properties. Moreover, in many cases the desire of directors has been not to develop the mines as a going concern, so much as to cause a temporary inflation, giving them an opportunity to unload, and, further, the "incubus of 'concession' which is suffered to strangle every interest in this country, has left its mark" upon the gold-fields. Many of these faults are, however, being remedied, and the agent anticipates much better results in the future. Still, he thinks, a warning to investors is necessary, and this we give in his own words. "While thus writing of the Kaap gold-fields and of their prospects. I would also urge on all those who desire to invest in these fields that before laying out their money they acquaint themselves with the details of the property which is before them. Properties are frequently taken to Europe for flotation which offer no warrant for the description which is given of them. Investors rush in, lose their money, and condemn the industry, while they ought rather to condemn their own recklessness. The gold-fields of the Transvaal abound in persons of great ability, but lacking integrity, who are ever on the lockout for a profitable swindle, and against such as these I would warn English investors. But of the success of the gold-fields, despite the dark cloud of commercial depression which now lowers over them, I cannot doubt. In the first six months of this year, Witwatersrand produced about 110,000 ounces of gold, of which 20,000 ounces were produced in the month of June. Barberton produced 24,850 ounces, of which 5025 ounces were produced in the month of June. With returns like these in the face of difficulties such as lie in the way of miners in this country, I cannot doubt that the Transvaal, when properly developed, will take its place among the greatest gold-bearing districts of the world."

COAL TRADE REVIEW.

NEW YORK, Friday Evening, Nov. 30.

Statistics.

Production of Anthracite Coal for week ended November 24th and year from January 1st:

Tons of 2240 lbs.	1888. Week.	1888. Year.	1887. Year.
P. & Read. R.R. Co.	206,556	6,566,117	6,805,742
Cent. R.R. of N. J.	119,455	5,235,402	4,381,072
L. V. R.R. Co.	180,000	6,111,067	5,459,668
D., L. & W. RR. Co.	137,350	6,329,904	5,404,725
D. & H. Canal Co.	95,548	4,075,865	3,577,094
Penna. R.R.	65,917	4,156,557	3,298,053
Penna Coal Co.	20,951	1,534,153	1,427,817
N. Y., L. E. & W.	20,000	858,210	589,935
Total	845,777	34,867,355	31,044,106
Increase		3,823,249	

The above table does not include the amount of coal consumed and sold at the mines, which is about six per cent of the whole production.

Production for corresponding period:

1883	29,169,265	1885	28,361,456
1884	28,325,931	1886	29,440,949

Production of Bituminous Coal for week ended November 24th, and year from January 1st:

EASTERN AND NORTHERN SHIPMENTS.

Tons of 2240 lbs.	1888. Week.	1888. Year.	1887. Year
Phila. & Erie R.R.	711	59,094	18,086
Cumberland, Md.	76,522	3,263,242	2,954,069
Barclay, Pa.	.....	140,917	164,150
Broad Top, Pa.	10,482	332,437	311,360
Clearfield, Pa.	77,609	3,028,481	2,864,219
Alleghany, Pa.	19,206	718,735	757,120
Pocahontas Flat Top	25,064	1,240,577	922,525
Kanawha, W. Va.	*37,608	1,459,295	1,283,684
Total	247,202	10,242,778	9,275,213

*Week ending November 21st.

WESTERN SHIPMENTS.

Pittsburg, Pa.	15,694	660,189	508,733
Westmoreland, Pa.	42,241	1,408,418	1,286,746
Monongahela, Pa.	3,859	358,106	346,757
Total	61,794	2,426,713	2,142,236
Grand total	308,996	12,669,491	11,417,449

Production of Coke on line of Pennsylvania R.R. for week ending November 24th and year from January 1st, in tons of 2000 lbs.: Week, 99,867 tons; year, 3,655,452 tons; to corresponding date in 1887, 3,305,233 tons.

Anthracite.

The trade is quiet, with a large amount of coal moving, chiefly on old orders, and some cutting of prices by individual operators. The companies are quite firm as a rule, and there is no indication that the market is in any respects a demoralized one, or is likely to become so.

The Reading Company has given strict orders to its agents not to take any orders except at full circular rates, and the mines are under instructions to send on only what is ordered. No coal will be stocked. The New Jersey Central & Lehigh Navigation Company have given practically the same orders.

Notwithstanding the enormous production of coal, to which we have referred on several occasions recently, the stocks at tidewater are very low. The Del. & Hudson Company, instead of being anxious to clear their docks at Rondout, as was reported last week, inform us that they have but about 8000 tons of coal at that point, except a small quantity of pea coal which is always kept to supply the local trade. Even at Honesdale, which is the principal stocking place of this company, the accumulation, outside of pea coal, is at present only a few thousand tons, and of pea coal not more than 45,000 tons. This company usually has a large amount of coal there which is carried through the year. It will keep the company pretty well occupied to supply the market, and to accumulate the usual amount of coal at Honesdale during the next few months.

The Philadelphia & Reading Coal and Iron Company announces that it will make no change in the price of anthracite coal for December. To-morrow it will shut down 18 collieries and run about 37 on three quarters time.

The fiscal year of the company having closed, the season has come for making repairs, when the production naturally is greatly reduced. The company shows a considerable loss on its coal business during the year.

We are very pleased to note that some substantial interest is being taken in the question of reducing the waste in mining, and we trust that before very long we shall be able to report that experiments are actually being made with this object in view.

Comparative figures of shipments at Hoboken, Perth Amboy and Port Johnson for the current year are as follows: Hoboken, 3,000,000 tons; Perth Amboy, 1,916,917 tons; and Port Johnson, 2,015,342 tons. The month of December and a portion of November in these figures have been estimated by competent authority.

Our quotations are continued as to companies' coal, but individual coal is somewhat shaded. Thus for Lehigh coal we may quote as follows: Broken, from $3.75 upward per ton; Egg, $3.85 upward; Pea, from $1.90@$2.50 per ton. Free burning coals are also shaded a little, though perhaps scarcely as much. We continue company prices as follows, f.o.b. for free burning coal at New York shipping ports: Broken, $3.95; Egg, $4.30; Stove, $4.65; Chestnut, $4.65; Pea, $2@$2.25.

Bituminous.

The demand still continues very fair for jobbing coals, and there is still a considerable scarcity in this harbor. Cars are a little more abundant for line delivery, but for tide water the complaint is still made that the coal cannot be brought forward as rapidly as

it is wanted. Nominal prices are continued as follows: $2.60 f.o.b. Baltimore and Georgetown, $3.25 for New York Harbor shipping ports; $3.50 alongside New York.

During the week a considerable amount of coal was lost both in this harbor, on the Sound and on the river, from the terrific storm which raged for two days. A number of barges and vessels and one of the steamers of the Reading fleet were wrecked.

Buffalo. Nov. 29.

[From our Special Correspondent.]

Anthracite coal unchanged in price, with no new features to report relative to trade, excepting that the "car trouble" has ceased to be a trouble, as the lessened demand for shipments by lake releases cars for interior requirements.

Bituminous coal continues in good demand, with firm feeling among dealers. Orders are quite readily filled, as rail transportation is more adequate than has been the case for many months. The price list shows no appreciable variation, but whether there are any changes therein can only be found out by buyers when they meet the sellers. The general public, at any rate, are not posted, but must be satisfied with knowing the nominal quotations only.

The year's lake and canal coal statistics of this port will show the increased magnitude of the trade, and may be looked for in the next number of the ENGINEERING AND MINING JOURNAL.

At Tonawanda, ten miles from Buffalo, there is quite an excitement consequent upon the discovery of natural gas. Steps are to be taken immediately to ascertain the quantity likely to be produced, the cost and other contingent matters.

At Zoar, about thirty miles from Buffalo, in Cattaraugus County, an extraordinary gas well was struck a day or two since, and great expectations have been formed in consequence. It will be time enough to write further when its capacity and relative permanency have been ascertained.

The shipments by lake westward from Buffalo were light. From November 22d to 28th, both days inclusive, 34,034 net tons, namely, 23,900 to Chicago, 5750 to Milwaukee, 1600 to Duluth, 1000 to Green Bay, 500 to Saginaw, 1250 to Detroit, and 34 to Perry Sound. The total shipments for the season thus far 2,527,614 net tons, including cargoes on vessels from Tonawanda not reported at our custom house.

The ruling rates of freight on coal were $1 to Chicago, 90c. to Milwaukee, 50c. to Duluth, 75c to Green Bay, 70c. to Saginaw, 50c. to Detroit.

Receipts of coal here by canal for third week in November, 5942 net tons; the shipments, 218 net tons.

To-day's weather rainy and mild with a few lake vessels taking on coal, but captains are not at all anxious to venture out. Several propellers and sail craft arrived. The latest *news* from the State canals indicates that all boats will reach their destination.

Boston. Nov. 28.

[From our Special Correspondent.]

There is very little movement in anthracite coal. Nobody is alarmed at the probability of high prices, and the buying is only such as immediate needs dictate. The tendency of the market is clearly towards increased weakness, though the market, as seen from here, is still in very good shape. There is some restriction of output to note, but more of it is needed. Broken and egg are weak, and stove coal is more in buyer's favor.

In bituminous coal there is next to nothing doing, and the business outside of contracts does not make a ripple. F. o. b. figures are unchanged, at from $2.45 to $2.65, there being still a considerable range, due largely to the condition of shippers for filling contracts. There is some gossip about next year's pool. The pool this season has been badly broken over, and if there is to be any next year, it will have to be materially strengthened. Nothing but heavy cash fines will keep some of the boys in check.

The freight situation is still a strong one. It does not yet appear what effect the storm will have, but no decline is looked for. The loss of the "Allentown" of the Philadelphia & Reading, with 1600 tons for their Salem pockets, is much deplored. The steamer was due Friday night and must have been disabled when the storm overtook her.

We quote vessel rates, exclusive of discharging: New York, $1@$1.20; Philadelphia, $1.50@$1.60; Baltimore, $1.55@$1.60; Newport News and Norfolk, $1.50@$1.60; Richmond, $1.75; Provincial, $1.90@$2.

The cold weather of a week ago gave the retailers a short-lived boom. The trade is in a healthy condition.

Delivered prices are: Stove and Nut, $6.50; Egg, $6.25; Broken, $6; Franklin, all sizes, $7.75; Lehigh Egg, $6.50; Broken, $6.25. Wharf prices 50 cents less than the above. Bituminous coal, $4.25 on the wharf.

There is being erected a large new shed at South Boston capable of holding 30,000 tons of coal, and the trade is much interested in the outlook. It is said that the Automatic Coal Handling Company is putting up the shed, but who is the Automatic Coal Handling Company. Some say it is the Boston Towboat Company under another name, and it seems to be admitted that this company will unload its big steamers into this shed by the new automatic machinery, and then load light draught barges for harbor and up-river delivery. The plan was to do this by means of the coal elevator, but their floating elevator was not a success and perhaps never will be. What the trade is anxious about is to know whether this company will, openly or through an agent, sell coal, instead of doing a mere transportation business. It is said that George Keyes, who is the Boston Coal Company (the retail dealer outside the combination), will manage the new coal shed for the Automatic Coal Handling Company, and the president of the latter corporation is also said to be identical with the president of the Boston Towboat Company. Should the Towboat Company become a coal dealer it would create considerable stir here.

Pittsburg. Nov. 29.

[From our Special Correspondent.]

Coal.—The shut-down will be inaugurated on Saturday; in fact, it has already begun. This movement was unavoidable, and will leave a large number of men out of employment at the opening of winter. The coal shipments for the present year were the largest that were ever shipped down the Ohio, exceeding 100,000,000 bushels.

Prices in the pools are:

PRICE OF COAL PER 100 BUSHELS = 7600 LBS.

First pool	$4.75	Fourth pool	$3.25
Second pool	4.25	Railroad coal	5.00
Third pool	3.75		

Connellsville Coke.—There is reported a very active market, with an upward tendency in values. The total number of ovens in the regions is 13,955; in blast, 12,253; week's tonnage, 125,595; increase over last week, 915 tons. Report says that Chicago will pay $1.50 for coke after December 1st. The outlook for the coke trade is certainly a good one. A large number of new furnaces will be completed and started up in the spring.

The new rates are: Blast-Furnace, $1.25 per ton; to dealers, $1.35; foundries, $1.40; crushed, $2.20.

Freight rates to Pittsburg, 70c. per ton: to the Mahanoy and Shenango valleys, $1.35; East St. Louis, $3.20; to Cleveland, $2.80; to Chicago, $2.75; to all other points the same proportions.

FREIGHTS.

The latest coal charters to per ton of 2240 lbs.

From New York to:—Bangor, Me., 1.25@1.30*; Bath, 1.30@1.40*; Beverly, 1.15*; Boston, 1.10*; Bridgeport, Conn., .60; Cambridge, Mass., 1.15*3c.; Cambridgeport, 1.10*; Charlestown, 1.10*; Chelsea, 1.10*; Com. Pt., Mass., 1.15*; E. Boston, 1.15*; E. Cambridge, 1.15*; Fall River, .75@.90; New Bedford, .80@.90; Newburyport, 1.25*; New Haven, .60; Newport, .75@.90; New London, .85; Norwalk, Conn., .60; Portland, 1.10*; Portsmouth, N. H., 1.20*; Providence, .75@.90; Salem, 1.15*.

From Philadelphia to:—Bangor, 2.00*; Boston, 1.60@1.70*; Charleston, .90; Chelsea, 1.55@1.60*; Com. Point, Mass., 1.60*; East Cambridge, 1.65*; Fall River, 1.15@1.25*; Galveston, 2.90*; Gardner, Me., 1.60*‡; George town, D. C., .85; Lynn, 1.75@1.85*; New Bedford, 1.15@1.25*; Newburyport, 1.75*; New York, .90†; Norfolk, .70; Portland, 1.50@1.60*; Portsmouth, N. H., 1.60*; Portsmouth, Va., .65; Providence, 1.15@1.25*; Richmond, Va., .80; Rockport, 1.22½*; Saco, Me., 1.75*; Salem, Mass., .90*; Savannah, 1.00; Washington, .85; Weymouth, 1.15*; Wilmington, N. C., .60.

From Baltimore to:—Bangor, Me., 1.60; Bath, 1.60; Boston, 1.65@1.70; Bridgeport, Conn., 1.35@1.40; Bristol, 1.25@1.30; Brooklyn, 1.15@1.20; Charleston, .90; Fall River, 1.55; Galveston, 3.00; Gardner, Me., 1.75; New Bedford, 1.45@1.50; Newburyport, 1.55; New Haven, 1.45@1.50; New London, 1.45@1.50; New York, 1.25; Portland, 1.65@1.70; Portsmouth, N. H., 1.75; Providence, 1.50; Quincy Point, 1.50; Richmond, Va., .80; Roxbury, 1.50 3c.; Salem, Mass., 1.65@1.70; Savannah, 1.15; Somerset, 1.35; Williamsburgh, N. Y., 1.25@1.35; Wilmington, 1.00@1.10.

* And discharging. 3c. per bridge extra. † Alongside. ‡ And towing.

METAL MARKETS.

NEW YORK, Friday Evening, Nov. 30, 1888.

Prices of silver per ounce troy.

Nov	Sterling Exch'ge.	Lond'n Pence.	N. Y. Cts.	Nov	Sterling Exch'ge.	Lond'n Pence.	N. Y. Cts.
24	4.88	43	94	28	4.88	42 15-16	93⅝
26	4.88	43	93⅞	29	*	*	*
27	4.88	43	93⅞	30	4.88	42⅞	93½

* Thanksgiving Day.

Silver has shown a weaker tendency past week, probably due to decline in India council bills, lower exchange here and large offerings.

Foreign Bank Statements.—The amount of bullion withdrawn from the Bank of England on balance Thursday was £100,000. The bullion in the Bank of England has increased £13,000 during the past week. The proportion of the reserve to liability, which last week was 39 93 per cent, is now 41·27 per cent. The weekly statement of the Bank of France shows a decrease of 8,100,000 francs in gold and 950,000 francs in silver.

Mexico and Silver Money.—A resolution now in committee of the Chamber of Deputies, City of Mexico, directing the President to endeavor to procure arrangements with the United States, England, and the Latin nations of Europe which shall make silver international money, creates much discussion, but the general opinion of the press is that it will be difficult to secure unanimity of opinion among the nations which have abandoned coining silver for other than small money. Some comment is caused because Germany is not included among the nations which are to be asked to enter into the arrangement.

Copper.—The copper market has been in a rather apathetic state during the past week, and very little business has taken place. The transactions which have been reported have, however, been at full prices, and spot Lake is now quoted 17·55@17·65; and December, 17·50@17·60. The few purchases made at these figures are understood to be to cover short sales. The demand for casting copper continues remarkably strong, with very little offering, and we have to quote for same 16⅛@16¼.

We understand that negotiations are again going on between the agents of the French syndicate and the general body of consumers for another pool sale to meet their requirements over the first 3 months of next year, but further particulars relating to this matter have not yet transpired.

The visible supplies in Europe again show an increase for the first fortnight of this month of 877 tons, which brings the total of such visible supplies now up to 94,865 tons.

In London the market has been rather flat for the speculative descriptions, and Chili Bars have given way about 10s. a ton, closing at £77 10s. 0d. to £77 12s. 6d. for Spot and £78 to £78 2s. 6d. 3 months. G.M.B. are also rather lower, at £77 15s. to £78 Spot. The refined sorts remain without any change in quotations.

This morning we received the following telegram from Calumet, Mich.: "Calumet No. 3 shaft is on fire from the sixth level; eight men are missing." Another private telegram says: "Calumet on fire in the sixth level in man engine shaft. All shafts closed except No. 3." Still another private telegram says: "Eight men suffocated."

This startling news at once became the subject of general conversation. There can, apparently, be no doubt that the fire is of incendiary origin; in fact, it is said that twice within a month the mine was found to be on fire, but the fire was extinguished.

It is almost beyond belief that any one could do such a dastardly act. There is no doubt that speedy justice will be meted out to the offender if he is captured.

Another report says: "A large party of men were working at the time of the fire, which, when discovered, had made such progress that the smoke was terribly dense, and their lives were in great danger. All made a rush for the surface, but eight men are missing. That they are dead is certain. The mine location is completely covered with the dense smoke, and the fire looks worse than did the last, but, being nearer the surface, it is believed the damage financially will not be so great."

Some holders of Calumet & Hecla stock were evidently frightened, as sales were made at $255, against $305 two days ago. The price has since risen to $263 @$265.

Tin.—A rather dull market has been experienced in this metal, and several lots (in all amounting to probably 100 tons) of spot tin have again been sold out at low prices for sharp cash. Good buying for large quantities in futures continues, however, and sellers are reluctant to commit themselves for deferred deliveries, as there is little or no prospect of covering such sales to advantage, the quotations in foreign markets being above the parity of those ruling here. During the last few days consumers have again been buying more freely, and our latest quotations are: Spot, 22⅜ @22½; December, 23½; January, 22⅝; February, 22¾.

The shipments of tin from the East to London are at present very light, and, according to latest cable advices, do not amount to 1000 tons.

In London prices have continued comparatively steady, with only small fluctuations in values. At one time spot tin dropped to £100 12s. 6d., but a rally has since taken place, and our last cable advices report a firm close at £101 5s. spot and £101 15s. to £102 three months.

Lead.—After the very heavy sales of the previous week it is only natural that the week just past should have been quieter, and this quietness was increased by holders and smelters asking somewhat higher prices, whilst consumers were reluctant to buy at any advance. In spite of this attitude of the producer and consumer we have to report somewhat higher prices, the closing quotations being Spot, 3·72½@3·77½; December, 3·75@3·80; January and February, 3·80 @3·85.

Chicago, Ill.—Messrs. Everett & Post telegraph us to-day as follows: The market remains about the same; if anything, a shade firmer. There is a general disposition to buy. Sales for the week foot up 700 tons, at 3·50.

St. Louis, Mo.—Messrs. John Wahl & Co. telegraph us to-day as follows: Market does not reveal any activity; but, on the other hand, shows no sign of weakness, holders, having quite frequent inquiries for small lots, maintaining prices fairly well. Common salable at 3·42½c.; refined corroding, 3·50c.

Spelter.—This article was rather neglected in the early part of the week, and several lots being pressed for sale, lower prices had to be accepted. These parcels being now, however, out of the way, a healthier tone is apparent, and a decidedly better inquiry. We now quote domestic 5 to 5⅛.

The foreign markets have also been dull, and London reported a drooping market, with good ordinary down to £18 2d. 6s.; but cable advices to hand to-day report a strong and advancing market, with good ordinaries £18 7d. 6s. to £18 10s., and specials £18 12d. 6s. to £18 15s. As only light stocks of this metal are held in Europe as well as in this country, it can hardly be expected that prices will give way to any material extent.

Antimony is very scarce. We quote Cookson's 14c., and Hallett's 10⅝@10¾. In England nothing is obtainable for early shipment and £46 is asked for Cookson's, £45 for Hallett's.

CHEMICALS AND MINERALS.

NEW YORK, Friday Evening, Nov. 30.

Heavy Chemicals.—There is practically little change in this market. Spot business is largely of the hand-to-mouth order, and contracts for future delivery are on a unsettled basis, owing to the uncertainties of the English situation. As stated last week, efforts are being made to form a combination of manufacturers in all branches of the English alkali trade, but as yet little progress worthy of record has been made in this direction. The combination proposed is in itself so gigantic, and the interests to be reconciled so diverse, that those who view the subject impartially are inclined to doubt the probability of its being consummated. At all events, the rumors now going the rounds, and being used in some quarters to induce buyers to close contracts at once, are so purely conjectural that the outlook for 1889 cannot be predicted with any reasonable degree of certainty. Buyers are, therefore, acting prudently in holding off, as they now seem to be doing, until something definite is learned upon which to base values for the coming year.

Liverpool cables report that caustic soda is weaker, owing to the anxiety of speculators or outside holders to force sales of lots that were purchased at lower prices, probably before the caustic makers' association was formed. The manufacturers, of course, are very firm in their views, and to strengthen their position have ordered, it is stated, a further restriction in the December output. Messrs. S. W. Royce & Co., of Manchester, report on the 15th inst. as follows: Caustic soda, though in fair request, has again receded about 2s. 6d. per ton on last week's quotations. Bleaching powder continues in strong demand, and makers of soda ash are fully engaged for early delivery. Soda crystals are firmer. Sulphate of ammonia is steady, though the demand is not quite so strong. Sulphate of copper has improved, and there is rather more inquiry for acetates of lead.

There is nothing new in the local trade, stocks in most instances being light and spot business of little importance, and to a large extent affected by the national holiday, as well as by the indisposition of consumers to take anything more than actually necessary at present. Carbonated soda ash, 48 per cent, is moving fairly, as spot offerings are light prices are well sustained. Spot quotations are 1·25 @1·35c., according to quantity and brand, while contracts for future delivery have been placed at the inside figure. Caustic soda ash, 48 per cent, is neglected; prices are nominally in the neighborhood of 1·25c. We hear of quotations for lots to arrive December 10th ranging from 1·27½@1·35c., and for December shipment to New York, 1·30@1·37½c., but as these are circular rates they are probably above the actual market level. Refined alkali, 36 per cent, is quoted nominally at 1·16½c. for December shipment. Caustic soda, as reported above, shows another decline in spot values; 2·25@2·30c. are probably fair quotations at present for 70, 74 and 76 per cent. Little is being done in futures and quotations are unsettled, dealers generally quoting "as arranged," which may mean as compromised. Sal soda continues firm in sympathy with the Liverpool market. Spot lots are held at about 1c., while futures are quoted at 95c. for large orders. Bleaching powder has recovered a little from the weakness noticed in our last report. Spot supplies are pretty well taken up and the market may be written 2·12½c. for large lots. Contracts for future delivery are quoted at 2·06¼@2·10c.

Hyposulphite of soda is quoted on dock, New York, in casks, 1·55@1·65c.; in store in kegs, 1·70@2c., according to quantity; on steamer in casks due December 10th 1·60@1 75c.

Acids.—A fair, steady business is reported, values being well sustained. Orders are not large, but in a jobbing way are numerous enough to aggregate a very fair volume of trade. Otherwise, the market possesses few interesting features.

Acetic acid is moving principally to fill old contracts. There is little inquiry and new business is not plentiful. The outlook for the future is therefore not encouraging and manufacturers seem to be willing to make concessions to secure contracts Spot quotations are unchanged and futures nominal.

Nitric acid is very firm. In addition to there being a good consumptive demand for the article itself, the price of nitrate of soda is advancing so rapidly that an advance in the price of the acid will be necessary before long. As yet quotations are unchanged.

Muriatic acid is moving slowly and in a small way. Prices remain as previously quoted.

Oxalic acid is sold in jobbing lots only, and there are no features in the trade worthy of note. The usual quotations are 9c. per lb. for prime English or German, ex store, New York, Boston and Philadelphia. This figure would probably be shaded for large orders.

Sulphuric acid is firm, manufacturers being pretty well engaged for some time to come. There is little to be had for immediate delivery except at rather stiff prices. For 66 degrees, we quote ·95@1·25c. according to quantity, and for 60 degrees ·90@·95c.

Fertilizers, etc.—Prices are upheld by a fair steady demand, and considerable business has been transacted in a quiet way. The revised price-list is about as follows: Azotine, $2.55@$2.60 as to quality; dried blood (city), low grade, $2.50@$2.55 per unit; Western high grade, $2.60@$2.65 per unit for ground material; tankage, high grade, $24@$25 per ton; low grade, $22@$23 per ton, as to quality. Fish scrap, $25 per ton f.o.b. factory. Sulphate of ammonia, $3.40 per cwt.

Refuse bone-black, guaranteed 70 per cent phosphate, is quoted at $19.00@$19.50 per ton. Dissolved bone-black is 97½c.@$1 per unit for available phosphoric acid, and acid phosphate 75@80c. per unit for available phosphoric acid.

Steamed bones, unground, $19; ground, $25@$26.

Charleston rock, undried, $5 per ton; kiln dried, $6 per ton, both f.o.b. vessels at the mines. Charleston rock, ground, is held at $10@$10.50 ex steamer at New York.

Muriate of Potash.—Arrivals are still large, but the strong consumptive demand that has existed for some time past has absorbed everything on the spot. Prices, although unchanged, are firm at $1.80 per cwt., basis of 80 per cent., by sail shipment, and $1.82½ by steamer shipment.

Double manure salts continue in limited supply. Prices are firm at 1·15@1·20c. basis of 48 per cent potash. Sulphate of potash, basis of 90 per cent, remains at $2.30 per cwt.

Kainit.—Prices are nominal, nothing to be had on the spot, freights scarce, and offerings for shipment light.

Brimstone is in very limited supply on the spot, but prices for future delivery are weaker, owing to a reduction in freight charges, which will probably continue for some time ahead. Spot quotations are nominally $22@$23 for best seconds. For future delivery the quotations are $20@$20.50.

Nitrate of soda has again advanced. Sales of 10,000 bags from store are reported. Supplies on the spot are estimated at 70,000 bags. The spot quotation is now 2·40c., with 2·35c. asked for shipment.

Cream of tartar remains at previous figures, 31@31¼c. for crystals, and 31¾@32½c. for powdered.

Acetate of lime is moving in a small way for immediate consumption at 2·12½c. for gray and 1·05@1·10c. for brown.

Minerals.—Sulphate of barytes is sold in jobbing lots at the old quotations, which are as follows: $21.50 for best special demands of imported, $17.50@$18.50 for best No. 1; off-colored grades, $12@$15, according to quality.

China clay is moving in a small way. The better grades are in limited supply, and consequently are held firmly at $18. Medium and low grades vary from $12.50 to $16.

Chalk.—Little is offered, although prices have a weaker tendency, owing to a reduction of freight charges.

BUILDING MATERIAL MARKET.

NEW YORK, Friday Evening, Nov. 30.

The week on the Building Material Exchange has been rather quiet, business being interrupted by the holiday and by the storm of Sunday, followed by rainy, misty weather on Monday and Tuesday. The weather prevented shipments, delayed cargoes, and did considerable damage to many of the vessels afloat. We understand that a special meeting of the members of the Building Material Exchange to consider the question of consolidating with the Mechanics' and Traders' Exchange will be called shortly. The terms of consolidation are now being considered by counsel, who will take the necessary legal action should a consolidation be agreed upon.

Bricks.—There is very little change in this market, the quotations remaining at the old figures, although efforts have been made to raise the medium grades a little, as these find the most favor with buyers. Pales, although in much demand, seem to be sustained at about $2.50@$2.75 per thousand.

Lime.—The market is not overloaded to any noticeable extent, as there have been no arrivals of importance during the week to offset a fair demand. Although there have been further rumors of "cutting rates," "concessions," etc., the official figures seem to be well sustained, at least on Maine stock.

Cement.—Orders for Rosendale, we are informed, have been refused unless rail shipment was accepted. Orders for interior custom are being hurried as fast as possible, and dealers are all well engaged.

For prices of building materials and wages of laborers in New York and vicinity see our register of current prices.

IRON MARKET REVIEW.

NEW YORK, Friday Evening, Nov. 30.

American Pig.—There is very little now to note in this market. Consumption continues fair, but somewhat below the average at this season of the year. It is understood from high authority that the Thomas Iron Co. will not make any advance in the prices of its iron for the coming year's delivery. It is not absolutely certain whether there may not be a reduction in prices, but it is announced that there will be no advance. This, of course, is intended to hold this market against all comers, more particularly the Southern iron.

We still continue to quote No. 1 at from $18@$19; No. 2 from $17@$18, and Forge $16@$17.

Scotch Pig.—This market is a little weaker and we quote Coltness at $21, Dalmellington at $19.75 to $20, and Clyde $19.75 to $20. These are the only brands which are now in the market. The weaker market is probably due to a reduction in freights, but the latest cable advices to-day state that there has been a small advance in Glasgow prices, which would almost compensate for the weaker freight rates. There can therefore be but little change in the price here. Scotch iron comes in but very small quantities, and is used only by certain firms that believe it to be the only thing out of which they can make their castings. On the other hand nearly all the manufacturers who have heretofore used Scotch iron are now using Southern pig, and they report that Silicon iron of the South is quite equal in quality for most fine work to the best Scotch, while it is very considerably cheaper. The use of Scotch iron is therefore likely to become less and less until it ceases altogether.

Structural Iron.—We hear of no large contracts this article, but prices remain steady and there is much encouragement in the future.

Steel Rails.—At the meeting in this city this week the steel manufacturers discussed quite fully the arrangements for regulating the trade during the coming year. Practically the arrangements made last August are still to continue, with slight changes, however. Each mill has now the right to sell any part of its allotment, so that there is a prospect, if the smaller mills are not able to make money, that they will sell their allotments to the larger mills, and enable these to produce at still lower prices. This will certainly be of some benefit to the trade. The allotments for the several mills were not changed. During the week some contracts were made by Western mills at prices which were extremely low. It is said below the recent $26 figure of the new Pittsburg mill. The contention for this last order, which amounted to about 30,000 tons, was between one of the Pittsburg and one of the Chicago district mills. The prices are lower than anything that has yet been heard of in that district. The meeting of the steel men did not determine any selling price. They left this to each mill to be regulated as it saw fit, but the meeting sought to adjust the output to the needs of the market. The new Pittsburg mill was not represented. It is probable that the old arrangements will work smoothly again during the coming year. There is nothing on the surface to indicate any steel rail war, if we except the low price that has been received in this 30,000 tons order. As the new mills will shortly have secured enough orders to work on for some time, it is expected that some better prices will be obtained. As it is, those who ask $28 a ton simply do no business. The outlook for the steel rail trade is not considered very bright, though we hear of a good many roads which are offering securities, and we are told that it is much easier to place them now than it was a year ago.

Old Rails.—We continue to quote $23 to $24 for Tees and $25 for Double Heads, with a few thousand tons foreign rails to arrive, sold, it is said, at $23.25 in an Eastern mill.

Scrap is quiet and rather scarce at $20 to $21.

For all other prices see usual table of current prices.

Louisville. Nov. 27.

[Special report by Messrs. HALL BROTHERS & Co.]

There are not so many large orders being placed now as there were a week ago, although there is a fairly good buying movement in progress. Some furnaces have withdrawn from the market entirely, believing that better prices will be obtainable later on, while others less sanguine are accepting orders as they come from day to day at the current market figures. Quotations, which are cash f.o.b. cars at Louisville, will be found in our weekly register of prices.

Philadelphia. Nov. 30.

[From our Special Correspondent.]

A rather demoralized condition of affairs exists among the steel rail manufacturers, and the only information that can be had is not reliable, because it comes from parties on the outside some of whom are endeavoring to place orders and cannot or are not willing to do so. Quotations are nominal. It was thought a week ago that everything was patched up all right, but the bulls in the china shop would not have it that way, and matters are all mixed up. It would be dangerous to assert what bottom prices are, because just at this writing some cutthroat quoting is being done and it will be several days yet before the sky is clear. So far as our own market is concerned very little business has been done that can be got at. It is intimated that if friendly relations cannot be maintained that two or three of the old and conservative establishments will wipe the floor up with a few of the smaller concerns. Prices, $27 to $28.50. Some makers still insist that an upward tendency will soon manifest itself, but the majority think that with the productive capacity pointing toward the three million limit, prices will not likely improve. The other end of the market, namely pig-iron, shows very little life. Prices are firm simply because makers are not anxious to sell far ahead and buyers prefer to purchase from hand to mouth. There is an increased production promised, and six or seven furnaces will be stocking the market before midwinter. No one can give a good reason for the opinion entertained. Prices will likely remain where they are for a week or two at least; beyond that it is impossible to predict.

Brokers, who ordinarily are able to see clearly into the bottom of things, are unable to do so now, on account of the universal fogginess. The trouble is that the amount of requirements for the coming year have not been even prognosticated. The amount of railroad building that will be entered upon has not been estimated.

There is considerable activity in the steel bloom market. Steel billets and slabs are under active inquiry. Muck bars are not as firm as they were two weeks ago, though no pronounced weakness has been developed. The makers are anxious to secure business, but are trying to hold on to September and October prices.

Nails are quoted at the same figures as at last report. Skelp continues active in small lots, and the tendency in prices is downward. A good deal of bar iron has been asked for this week, and a multitude of small orders have been booked at city and country mills, but there is no general activity in large lots, such as helps to improve or strengthen prices. Business in plate and tank iron is quiet, excepting among ship yards, and the ship yard people are making out specifications for large quantities, which it is thought when placed will help to strengthen the market. One or two large

orders have just been placed. Structural iron is quiet and no additional facts can be gathered from the reports to-day. The sheet iron demand is without notable change. Merchant steel is moving along as usual. Old rails will continue quiet till prices for finished products advance or until rails decline. Scrap is scarce in choice lots and No. 1; all other kinds are in fair supply. For other quotations see our usual table of current prices on another page.

Pittsburg. Nov. 29.

[From our Special Correspondent.]

Raw Iron.—The market during the week exhibited less activity than the previous one. Consumers being evidently well supplied, at least for the present, together with Thursday being a legal holiday, tends to make dealers indifferent for the present, hence the demand for certain kinds has been of a more hesitating character than was looked for, causing a weakening in gray forge pig of 25 cents. There is no material falling off in consumption, however, and the most experienced men in the trade express the opinion that while there may be a weakening for a short time, the conditions are extremely favorable for activity after the advent of the new year. Besides coke producers are talking of a further advance in price, which will add from 37 to 40 cents per ton to the cost of making raw iron. This advance must be paid by one of the parties; the question will be which. The demand for coke is steadily increasing. It is stated on good authority that Chicago consumers are willing to contract for December coke at $1.50. This movement will force others to pay the same price. Estimated product of the Connellsville region for last week reached 125,595 tons, exceeding previous week 915 tons. City furnaces are in full operation, turning out daily a large amount of iron. Furnaces in the Shenango and Mahoning valleys are reported running to their full capacity, with plenty of orders booked and in sight. Consumers, generally speaking, have about all the iron purchased they will require for December. Some have even contracts that extend to February, while many others are not so situated, and will require a fresh supply in the near future. A daily consumption of 6000 tons makes iron disappear rapidly. Gray forge shows signs of weakness. Bessemer is firmer. Muck bar unchanged. Old iron rails quiet, unchanged. Scrap material changing hands freely. Steel slabs and billets steady.

Coal and Coke Smelted Lake Ore.	
1500 Tons Gray Forge, January	16.25 cash.
1500 Tons Bessemer	17.25 cash.
1000 Tons Gray Forge, January and February	16.35 cash.
1000 Tons Bessemer, Spot	17.50 cash.
1000 Tons Bessemer, January	17.25 cash.
500 Tons Gray Forge	16.00 cash.
500 Tons Gray Forge	16.00 cash.
700 Tons Bessemer	17.50 cash
200 Tons No. 1 Foundry, all ore	18.50 cash.
100 Tons No. 1 Foundry	17.75 cash.
200 Tons No. 2 Foundry	17.00 cash.
Coke, Native Ore.	
1000 Tons Gray Forge	16.00 cash.
300 Tons No. 1 Foundry	18.00 cash.
100 Tons Silvery	16.75 cash.
100 Tons Mottled	15.50 cash.
400 Tons Gray Forge, Storage	15.50 cash.
50 Tons Silvery, Extra	19.00 cash.
100 Tons No. 2 Foundry	17.50 4 mo.
25 Tons Silvery	17.00 cash.
Charcoal.	
50 Tons Cold Blast	25.50 cash.
50 Tons Cold Blast	27.75 cash
Steel Slabs and Billets.	
750 Tons Steel Billets	28.75 cash.
500 Tons Billets	29.00 cash.
500 Tons Billets	29.00 cash.
700 Tons Billets	28.50 cash.
1000 Tons Billets	28.50 cash.
Muck Bar.	
2000 Tons Neutral	29.50 cash.
1000 Tons Noutral, January and February	29.75 cash.
1000 Tons Neutral, January	29.70 cash.
1000 Tons Neutral, December	29.50 cash.
300 Tons Neutral, Spot	29.25 cash.
Old Iron and Steel Rails.	
1000 Tons American T's	25.00 cash.
1000 Tons Mixed Lot Steel Rails	18.50 cash.
600 Tons American T's	24.50 cash.
600 Tons American T's	24.75 cash.
200 Tons Old Steel Rails	18.75 cash.
Steel Bloom Ends.	
2000 Tons Bloom Ends	18.50 cash.
1000 Tons Bloom Ends	19.00 cash.
Steel Wire Rods.	
750 Tons American fives	41.00 cash.
Scrap Material.	
200 Tons Old Iron Axles, net	29.00 cash.
200 Tons No. 1 Cast Scrap, gross	16.50 cash.
200 Tons Wrought Turnings, net	14.00 cash.
200 Tons Extra No. 1 Wrought Scrap, net	22.50 cash.
100 Tons Old Steel Axles, net	30.00 cash.

FINANCIAL.

NEW YORK, Friday Evening, Nov. 30.

The mining market was more active, showing larger transactions. Prices were firmer.

Comstocks are in fair demand. Latest reports from the mines note an improvement on the 900-foot level

IMPORTS AND EXPORTS OF METALS AT NEW YORK NOVEMBER 21 TO NOVEMBER 26, AND FROM JANUARY 1.

IMPORTS.

Spelter.	Week. Tons.	Year. Tons.
Am. Metal Co..	.....	359
Fr'densvi'eZ.Co.	.....	23
Hendricks & B..	.....	56
Lamarche's S's..	.....	6
Lewisohn Bros.	.....	61
Macy's Sons....	.....	28
Muller, S. & Co.	.....	56
Naylor & Co....	39	253
Osgood, F.....	.....	83
Perkins, C. L...	.....	725
Pope's S's & Co.	.....	28
Total.....	39	2,178
Corres. date 1887	.....	2,971
Zinc Sheets.	Tons.	Tons.
G. A. & E. Meyer..	.....	1
Lemanche's S's.	.....	596
Milne & Co.....	.....	1
Naylor & Co....	.....	137
Total.....	.....	735
Pig Lead.	Tons.	Tons.
Am. Metal Co..	.....	22
Caswell, E. A...	.....	46
Corwith & Co...	.....	111
Hendricks Bros.	.....	122
Total.....	.....	301
Corres. date 1887	.....	3,883
Antimony.	Casks.	Casks.
Total.....	62	3,020
Corres. date 1887	.....	3,347
Copper.	Pounds.	Pounds.
Lewisohn Bros. from Liverpool	.....	161,824
Nickel.	Lbs.	Lbs.
McCoy & Sanders	.....	169,586
Total.....	.....	169,586
Tin.	Tons.	Tons.
Abbott & Co....	.....	3,448
Am. Metal Co..	.....	619
B'dwell & French	.....	201
Bursler, Ira.....	.....	29
Crooke S. & R. Co.	.....	469
Crooks & Co....	.....	358
Davol & Sons...	.....	15
Dickerson, VanD	.....	10
Funch, Edye & Co	.....	10
Hendricks Bros.	.....	181
Knauth, W. & K	.....	48
Lehnaier Sons..	.....	50
Lewisohn Bros..	.....	15
Muller, S'll & Co.	67	4,849
Nathan, Trotter	.....	22
Naumann, F....	.....	8
Naylor & Co....	140	2,034
Phelps, Dodge..	.....	1,784
Pope, Jas. E., Jr.	.....	196
Pope's Sons & Co	.....	124
Schwaerer Bros.	.....	7
Thomsen, A. A..	.....	50
Thomson, D.....	.....	248
Total.....	207	14,713
Corres. date 1887	404	13,106
Tin Plates.	Boxes.	Boxes.
Am. Metal Co..	.....	705
Bartlett & Co...	.....	200
Bridge & Beach	.....	339
Bruce & Cook..	.....	99,794
Byrne, James...	247	47,683
Carter, G. T....	.....	3,583
Cen. Siam. Co..	.....	34,396
Coddington & Co	1,002	147,786
Corbierre, F. & S.	.....	3,375
Cort & Co., N. L.	1,704	104,169
C. Fruit Jar Co.	.....	1,470
Crocker Bros...	.....	548
Crooks & Co....	800	63,339
e Mill & Co....	.....	18,023
Dickerson, V. D.	.....	244,725
Dolly, T. G. F...	.....	112
Fairbanks, N. H.	.....	264
Hamilton & M..	.....	362
Henly & Earle..	.....	38
Iron Clad M. Co.	.....	119
Lalance & Gr'j'n	.....	4,735
Lombard, Ayres	.....	16,965
Merchant & Co.	783	18,388
Mersick & Co....	.....	5,860
Morewood & Co	.....	46,499
Naylor & Co....	.....	8,978
Newall Bros....	.....	208
Phelps, Dodge..	.....	600,353
Potts, Son & Co.	.....	573
Pratt Mfg. Co..	.....	151,159
Saunders Bros..	.....	330
Shepard & Co...	.....	77,204
Smith & L'kw'd.	.....	200
Somers Bros....	.....	768
Stroud & Co....	.....	686
Taylor, N. & G..	.....	540
Thomsen & Co..	1,955	147,270
Underhill, A. M.	.....	21
Warren & Co...	.....	1,665
Wheeler & Co..	.....	9,947
Whittemore & C.	.....	46,668
Wolff & Reesing	.....	28,792
Wright & Sons.	.....	165
Total.....	6,710	1,928,966
Corres. date 1887	40,558	1,832,259
Pig-Iron.	Tons.	Tons.
Abbott & Co....	.....	600
Austin & Co....	.....	100
Baldwin Bros...	.....	100
Bartlett & Co..	.....	5,100
Carter, G. T....	475	1,105
Crocker Bros...	665	14,097
Crooks & Co....	.....	800
Dana & Co.....	.....	1,250
Downing & Co..	.....	351
Drum'nd, McC'll	.....	20
Erie Despatch..	.....	250
Foley, E.....	.....	200
Gersenheimer & Co	.....	30
Hartf'd Cast. Co.	.....	57
Henderson Bros.	.....	1,895
Holt, H. N.....	.....	50
Irvin & Co.....	.....	50
Knauth, N. & K.	.....	15
Lee & Co.....	.....	375
Milne & Co., A.	.....	2,467
Naylor.....	.....	6,818
Perkins, C. L...	.....	5
Pierson & Co...	.....	15
Page, New'l & Co	.....	13
Pope, J. E., Jr..	.....	150
Pratt Mfg. Co..	.....	10
Sanderson & S'ns	.....	2
Stetson & Co...	200	13,207
Tonsila, M. R...	.....	120
Walbaum, W. H.	.....	400
West. Dispatch.	.....	50
Williamson & Co	100	4,900
Wright & Son..	.....	20
Total.....	1,630	54,612
Corres. date 1887	.....	135,067
Steel Sheets, Billets, Forgings, etc.	Tons.	Tons.
Abbott & Co....	6	2,137
Arkell, Jas.....	.....	17
Belcher, H. U....	.....	23
Bowker, C. F...	4	295
Bruce & Cook...	.....	7
Carey & Moen..	.....	24
Carter, G. T.....	.....	934
Coe, J. A.....	.....	16
Cohn, M.....	.....	186
Cooney, D. J....	.....	20
Crooks & Co....	.....	819
Crousbey, H....	.....	236
Dana & Co.....	.....	1,860
Downing & Co.	.....	433
Henderson Bros.	.....	31
Holt, H. N.....	.....	6
Hondolette & D.	.....	13
Hugill, Chas....	7	213
Irwin & Son....	.....	1
Kunhardt & Co.	.....	33
Lalance & G....	.....	308
Lazard Freres..	.....	50
Leng, J. S.....	.....	63
Lebenberg, N....	.....	36
Littlejohn, Jas.	.....	40
Lundberg, G....	99	381
Mersick & Co...	.....	138
Milne & Co.....	86	2,055
Montgomery & C	.....	79
Moore's Son & Co	.....	25
MullerSchall & C	.....	5
Manas & Son...	.....	10
Naylor & Co....	246	13,111
Newton & Shipm	.....	83
Oelrich & Co...	190	540
Ogd'n & Wallace	.....	326
PhelpsDodge & C	.....	3
Phœnix Steel Co	.....	20
Pierson & Co...	56	1,047
Pilditch, F. S...	8	357
Power, C. W....	.....	57
Pratt Whi'y & Co	.....	33
Prosser, Thos...	.....	3,065
Roebling's Sons.	.....	390
Sanderson & Son	.....	42
Seaburg, C. B..	.....	2
Shotts Iron Co..	.....	15
Steinberg & Co.	.....	4
Strouse & Co....	.....	59
Temple & S.....	.....	23
Union Bridge Co	.....	288
Wagner, W. F..	41	1,164
Walbaum, W. H.	.....	2,479
Wallace & Co..	.....	41
Walschid, C. A.	.....	15
Webb, J. B.....	.....	1
Wessel, Aug....	.....	4
Wetherall Bros.	.....	2
Wetherill & Co.	.....	5
Wheeler & Co..	.....	12
Whiting, E. W.	.....	11
Whitney & Co..	.....	51
Williams & Whit	30	48
Wilson, J. G....	.....	112
Whittemore & C	.....	6
Wolff, R. H	14	464
Wright's S. & Co.	.....	10
Total.....	787	35,482
Corres. date 1887	133	81,076
Bar-Iron.	Tons.	Tons.
Abbott & Co....	15	2,762
Abeel Bros.....	.....	3
Bacon & Co.....	.....	160
Hugh Cranshaw	.....	1
Downing & Co..	200	351
Holt, S. N.....	.....	210
Jacobus, E. Y...	.....	16
Lilienberg, N....	.....	16
Lundberg, Gust	.....	700
Mersick & Co..	.....	29
Milne & Co.....	50	333
Naylor & Co....	.....	515
Ogd'n & Wallace	.....	4
Page Newell & C	.....	122
Philips, C. M...	.....	20
Stroud & Co....	.....	8
Wallace & Co..	.....	19
Wilson, J. G....	.....	11
Totals.....	250	5,277
Corres. date 1887	100	13,795
Steel & Iron Rods.	Tons.	Tons.
Abbott & Co., J..	.....	7,221
Amer. Screw Co.	.....	858
Bacon & Co.....	.....	223
Baldwin B. & C.	.....	53
Bowker, C. F...	.....	3
Carey & Moen..	.....	890
Cohn, M.....	.....	69
Dana & Co.....	223	6,405
Downing & Co..	.....	347
Galpin, S. A....	.....	2,742
Heyn, A.....	.....	1,908
Hondolette & D.	.....	30
Hugill, Chas....	.....	41
Jacobus, E. Y...	.....	12
Lazard Freres..	.....	695
Leng, J. S.....	.....	850
Lilienberg, N....	.....	450
Lundberg, G....	.....	120
Milne & Co., A.	.....	1,408
Montgomery & C	.....	73
Muller, Schall & C	.....	150
Naylor & Co....	203	19,363
Newton & Ship'n	.....	2
N. Y. Barb W. Co.	.....	20
Page, Newell & C	.....	152
Perry & Ryer...	.....	100
Pierson & Co..	.....	51
Pilditch, F. S...	.....	21
Prosser, Thos...	.....	162
Roebling's Sons.	.....	1,828
Sanderson & Son	.....	67
Sheldon & Co...	.....	11
Walschid, C. A.	.....	15
Washburn M. Co	.....	35
Wheeler & Co..	101	101
Whittemore & C	.....	1,705
Wilson, J. G....	.....	26
Wolff & Co.....	68	2,198
Total.....	695	50,403
Corres. date 1887.	1,916	114,883
Old Rails.	Tons.	Tons.
Baldwin Bros..	.....	100
Bowen'g & Arch.	.....	100
Brown B. & Co.	.....	668
Crossman & Bro	.....	1,005
D., L. & W. R. R.	.....	409
Frankfort, M...	.....	100
Geisenheimer & C	.....	100
Henderson Bros.	.....	537
Neuma'k & Gross	.....	1,912
Stetson & Co....	.....	230
Waltam & Co...	.....	300
Winter & Smil'ie	.....	80
Total.....	.....	5,541
Corres. date 1887.	650	151,590
Sheet Iron.	Tons.	Tons.
Bruce & Cook..	.....	53
Coddington & Co	.....	1,749
Crooks, R. & Co.	.....	10
Newton & S.....	.....	4
Thomsen & Co..	.....	2
Wagner, W. F..	.....	40
Whitney & Co..	.....	15
Wolff & R.....	.....	40
Total.....	.....	1,913
Corres. date 1887.	30	1,924
Scrap Iron.	Tons.	Tons.
Abbott, A.....	.....	206
Boothby, J. H..	.....	80
Bowring & Arch.	.....	200
Brown B. & Co..	.....	20
Burgess & Co...	.....	172
Crossman & Co.	.....	47
Froth'ham B. & C	.....	248
Geisenheimer & C	.....	565
Gerhardt, P. T..	.....	8
Johnson & Co...	.....	85
Muller, Schall & C	.....	15
Ne'mark & Gross	.....	321
Purdon & W. ..	.....	75
Salter & L.....	.....	.....
Trowbridge & Co	.....	75
Ward & Co.....	.....	150
Total.....	.....	2,157
Corres. date 1887.	40	16,935
Charcoal Iron.	Tons.	Tons.
Abbott & Co..	.....	3
Bacon & Co...	25	127
Downing & Co..	.....	25
Lilienberg, N....	.....	15
Lunberg, G.....	.....	16
Mersick & Co...	.....	6
Milne & Co.....	.....	137
Muller, S. & Co.	.....	124
Naylor & Co....	43	931
Page, N. & Co..	50	589
Sanderson & S.	.....	1
Total.....	118	2,027
Spiegeleisen.	Tons.	Tons.
Abbott & Co....	.....	205
Arkell, Jas.....	.....	78
Bartlett & Co....	100	100
Crocker Bros ...	50	6,676
Dana & Co.....	.....	4,123
Geisenheimer & Co	100	473
Jansen, J. A....	.....	11,612
Kessler & Co...	.....	120
Naylor & Co....	300	13,796
Perkins, C. L...	301	3,644
Pierson & Co...	.....	1,050
Post, M. & Co..	.....	320
Total.....	851	42,197
Corres. date 1887	680	110,848
Iron Ore.	Tons.	Tons.
Cormack & Co..	.....	1,022
Danagh & G....	.....	25
De Flores, R....	.....	7,478
Earnshaw, A...	370	7,586
Ennis & Co.....	.....	1,721
Johnston & Co.	.....	300
Naylor & Co....	.....	3,706
Outerbridge & Co	.....	340
Wright & Co...	.....	1,630
Total	370	23,758
Corres. date 1887.	.....	59,210

EXPORTS.

Copper.	Pounds.	Pounds.
Abbott & Co....	.....	13,265,308
Amer. Metal Co.	.....	6,279,449
Becker & Co....	.....	1,250
Bridgpt. Copper C	.....	112,000
Copper Queen..	.....	224,034
Crooks & Co....	.....	1,000
Crossman & Bro	.....	4,000
Herold, E.....	.....	250,000
Ismay, J. B....	.....	115,000
Jones, R. W....	.....	189,984
Ladenburg & Co	.....	229,371
Ledoux & Co...	.....	110,276
Lewisohn Bros.	.....	5,022,754
Lomal, F. A....	.....	2,631,293
Mendel, S.....	.....	500,000
Muller, Schall..	.....	1,105,000
Naylor & Co....	.....	462,709
Neumark & G..	.....	120,143
Orford Co.....	.....	574,881
Parsons & Co...	.....	420,000
Phelps, Dodge..	.....	230,664
Pope's Sons	.....	1,917,780
Todd & Co.....	.....	112,026
Wilms & Trhne	.....	99,320
Total.....	.....	34,208,246
Corres. date 1887.	.....	11,023,814
Copper Matte.		
Abbott & Co....	.....	643,592
Amer. Metal Co.	403,041	5,792,471
Kunhardt & Co.	.....	41,652
Freidenav'le Zinc Co.....	.....	56,000
Ledoux, Chas...	.....	454,000
Ledoux & Co....	.....	469,720
Lewisohn Bros..	.....	1,126,822
Nichols & Co...	.....	516,783
Wilm's, Terhune	492,742	38,439,457
Total.....	895,783	45,164,953
Corres. date 1887.	.....	51,198,063
Copper Ore.		
Amer. Metal Co.	14,500	778,883
Kunhardt & Co.	.....	37,682
Mallory & Co...	.....	167,065
Mann, John H..	.....	28,000
Will's & Terhune	.....	629,446
Total	14,500	1,641,076
Corres. date 1887	.....	681,068

CURRENT PRICES.

CHEMICALS.

Acid—Acetic, ℔ 100 lbs..... 2.00@2.25
Muriatic, 18°, ℔ 100 lbs ... .. 1.15@1.20
Muriatic, 20°, ℔ 100 lbs..... 1.35@1.50
Nitric, 36°, ℔ 100 lbs ... . 4.00@5.50
Nitric, 42°, ℔ 100 lbs..... 5.50@7.00
Oxalic, ℔ 100 lbs..... 8.50@9.00
Sulphuric, 60°, ℔ 100 lbs. ..... 90@95
Sulphuric, 66°, ℔ 100 lbs ..... 95@1.25
Alkali—36 p. c..... .. .. 1.12½@1.15
48 p. c ..... 1.22½@1.25
Refined, 58°..... ....1.15 @1.25
Alum—Lump, ℔ lb..... .. ... 1¾
Ground, ℔ lb.. ... ... 1½@2
Lump ℔ ton, Liverpool £4 15
Sulphate of Alumina, ℔ ton.....£3 15
Aqua Ammonia—18°, ℔ lb..... 4¾
20°, ℔ lb..... 6
22°, ℔ lb.. ... . 6@7
26°, ℔ lb..... 10@11
Ammonia—Sul., ℔ 100 lbs... 3.35@3.45
Carb , per lb..... 7½@8
Muriate per lb... .....6½@8
Arsenic—White, powdered, ℔ lb. 3½@3½
Red. ℔ lb ..... 5½@5¾
White, at Plymouth, ℔ ton. ... £11 10
Asbestos—Am., p. ton..... $50@$300
Italian, p. ton, c. i. f. L'pool ..£50@£300
Asphaltum—P. ton 13.00
Prime Cuban, ℔ lb .. .. 4½@5½c.
Hard, ℔ ton.. ..... $28.00
Trinidad, refined, ℔ ton $30.00
Barytes—Sulph., Am. prime white17.00
Sulph., foreign, floated, p. ton....20.00
Sulph., off color, p. ton 13.00
Carb., lump, f.o.b. L'pool, ton... £6 0 0
No. 1, casks, Runcorn " ..£4 10 10
No 2, bags, Runcorn " " 3 15 0
Bleach—Over 35 p.c., ℔ lb. ....2.00@2.15
Borax—℔ lb 9¼
Refined at Liverpool, ℔ ton..... .. £29
Brimstone—*See Sulphur.*
Bromine—℔ lb..... .....37@38
Chalk—℔ ton..... .... 3.75
Precipitated, ℔ lb. 4
China Clay—English, ℔ ton. 18.50
Southern, ℔ ton..... ..... 13.50
Chrome Yellow—℔ lb..... ... 10@25
Cobalt—Oxide, ℔ lb..... ..2·60@2·90
Copper—Sulph. English Wks., ton£21 10s.
Precip., Eng. Wks, unit.. .fluctuating
Copperas—Common, ℔ 100 lbs... 62½
Best, ℔ 100 lbs..... .. ... 1.00
Liverpool, ℔ ton, in casks.....£1 10s.
Cream of Tartar—Am. 99%....31@31¾
Powdered, 99 p c..... .... 31¾@32½
Emery—Grain, ℔ lb 4
Flour, ℔ lb 2½
Feldspar—Ground, ℔ ton.....15.00
Fuller's Earth—Lump, ℔ bbl. .90@95
Powdered, ℔ lb.. 2
Gypsum—Calcined, ℔ bbl. 1.25
Iodine—Resublimed..... 3.60
Kainit—℔ ton..... .... 9.75@10.50
Kaolin—*See China Clay.*
Lead—Red, ℔ lb. 6
White, American, in oil, ℔ lb. 6½
White, English, ℔ lb 7½
Acetate, or sugar of..... 13@13½
Lime Acetate—Amer. Brown.1.15@1.10
" Gray2.10@2.12½
Litharge—Powdered, ℔ lb . . .. 6@6¼
English flake, ℔ lb..... 9
Magnesite—Greek, ℔ ton..... ...10.00
Manganese—lump, c.i.f. L'pool. 55s.
Per unit, up or down..... ... 1s. 6d.
Ground £5 10
Mercuric-Chloride—(*Corrosive Sublimate*) ℔ lb. 55
Mineral Wool—℔ lb..... 2
Mica—In sheets according to size.
1st quality, ℔ lb..... .....25@$6.00
Phosphate Rock—S. Carolina, per ton . o. b. Charleston..... 5.00
Ground, ex vessel New York.9.50@9.75
Canadian Apatite, lump, f. o. b. at shipping port, ℔ unit..... 24
Phosphorus—℔ lb..... 65
Plumbago—Ceylon, ℔ lb. ..... 4@5
American, ℔ lb..... 5@7
London, ℔ cwt..... .....£0 15 0
Potassium—Cyanide, ℔ lb..... .39@40
Bromide, ℔ lb..... 37
Chlorate, ℔ lb. ....14½@14¾
Carb. ℔ lb. ....4.70@5.50
Caustic, ℔ lb..... ..... 7½@8
Iodide... ..... .2.70@2.75
Muriate, ℔ 100 lbs..... .....1.80@1.85
Nitrate, refined, ℔ lb..... ... 6
Bichromate, ℔ lb 10½
Sulphate, ℔ 100 lbs. 2 30
Yellow Prussiate, ℔ lb..... ... 19
Red Prussiate, ℔ lb.. 42
Pumice Stone—Select lumps, lb. 3¼
Original cks., ℔ lb..... ..... 1¾
Powdered, pure, ℔ lb.. ... .. 2¼@2½
Pyrites—Non-cupreous, p. unit, s. 5d.
Quartz—Ground, ℔ ton. 18.00
Rotten Stone—Powdered, ℔ lb..3¼@3½
Lump, ℔ lb .... 6@10
Eng., powdered, ℔ ton..... ..... £4
Lump, ℔ ton..... ..... £5
Salt—Liverpool, ground ℔ bbl. . 75@80
Turk's Island. ℔ bbl ..... .30@33
Salt Cake—℔ 100 lbs. .....50@57
Saltpeter—Crude, ℔ lb. .... 5@5½
Refined, ℔ lb. .... 6@8
Soda Ash—Carb., 48 % 100 lb...1.25@1.35
High test .... 1.12½@1.15
Caustic, 48 % ....1.26¼@1.35
Soda Caustic, 60%..... 2 50@2 65
" " 70%..... 2.35 @2.45
" " 74-5%..... 2.35 @2.45
Sal, English, ℔ 100 lbs.... .95 @1.00
Sal, American, ℔ 100 lbs .... .95 @1.20
Nitrate, ℔ 100 lbs..... 2.25 @2.30
Strontium—Nitrate ℔ lb. 10½
Sulphur—Roll, ℔ lb..... ..... 1¾
Flour, ℔ lb 2
Crude Brimstone, 2s., ℔ ton.20.00@23.00
Crude Brimstone, 3ds, ℔ ton.19.50@21.00
Talc—Ground French, ℔ lb . ... 1¼@1½
Domestic, ℔ lb.... ..... ¼
Domestic, ℔ ton..... ..... 15 00
c. i. f. Liverpool, ℔ ton..... .. £4 50
Tannin—Pure, ℔ lb. . ...
Vermillion—American, ℔ lb.. .. 61
English, ℔ lb.. ..... 82@85
Vitriol—(Blue), Ordinary, ℔ lb.. 5¾@6¼
Extra, ℔ lb. ..... 6¼@6¾
Zinc Oxide—Am., Dry, ℔ lb. 4½
Antwerp, Red Seal, ℔ lb..... .....6@6½
Paris, Red Seal, ℔ lb. ....6¼@7
* Spot.

BUILDING MATERIAL.

Bricks—Pale, per 1,000 ..... 2.50@2.75
Jerseys, per 1,000... ..... 5.00@5.25
Hackensacks..... 5.50@5.75
Up Rivers, per 1000..... 5.25@5.75
Haverstraw seconds, per 1000 5.75@6.00
Haverstraw firsts, per 1,000.6.12½@6.50
Fronts, nominal.
Croton..... .....14.00@16.00
Wilmington..... 20.00@21.00
Philadelphia..... ... ... 28.00@29.00
Trenton ..... @28.00
Baltimore..... 37.00@41.00
Building Stone—Amherst freestone, per cu. ft.. ..... 95@1.00
Brownstone, per cu. ft. ..... 1.00@1.35
Belleville, N. J., red and gray rock, ℔ cu. ft. 1.00
Corncockle red freestone, ℔ cu. ft..... 1.00
Granite, rough, ℔ cu.ft..... 45@1.25
Granite, Scotch .. .. 1.00@1.05
Cement—Rosendale, ℔ bbl ..90@1.15
Portland, American, ℔ bbl... 2 15@2.45
Portland, foreign, ℔ bbl..... 2 20@3.00
Roman .... 2.65@2.85
Keene's coarse. ..... 4.50@5.50
Keene's fine..... ..... 7.00@8.25
Slate—Purple and green roofing, per 100 ft..... ..... 5.00@6.00
Red roofing, per 100 sq. ft... 15.00
Black, roofing, per 100 sq. ft. 4.25@5.00
Lime—Rockland, common... .1.00@1.20
Rockland, finishing..... .. .. 1.25
St. John, com. and finish ..... .90
Labor—Ordinary, per day.... 1.50@2.00
Masons, per day..... ..... 4.00
Plasterers, per day..... ... . 4.00
Carpenters, per day..... ... . 3.50
Plumbers, per day..... ..... 3.50
Painters, per day..... 2.50@3.50
Stonesetters, per day..... ..3.50@4.00
Tilelayers, ℔ day..... 3.50@4.50
Bricklayers, ℔ day..... 4 00

THE RARER METALS.

Aluminum—(Metallic), per lb...$5.00
Arsenic—Metallic, per lb..... 32
Barium—(Metallic), per lb.....975.00
Bismuth—(Metallic), per lb..... 2.40
Cadmium—(Metallic), per lb.....150.00
Calcium—(Metallic), per oz..... 1.50
Cæsium—(Metallic).....
Cerium—(Metallic) per oz..... .160.00
Chromium—(Metallic), per lb...200 00
Cobalt—(Metallic), per lb..... .... 6.00
Didymium—(Metallic), per oz..160.00
Erbium—(Metallic), per oz.. ...140.00
Gallium—(Metallic), per oz 3250.00
Glucinum—(Metallic) 4.50
Indium—(Metallic), per oz..... 158.00
Iridium—(Metallic), per lb.. ...650.00
Lanthanum—(Metallic), per oz.175.00
Lithium—(Metallic), per oz.....160.00
Magnesium—Per lb..... .... 4.00
Manganese—Metallic, per lb... 1.10
Molybdenum—(Metallic), per oz. 6.00
Nickel—(Metallic), per lb..... .65
Niobium—(Metallic), per oz.....128.00
Osmium—(Metallic), per lb 640.00
Palladium—(Metallic), per lb...400.00
Platinum—(Metallic), per lb. ..128.00
Potassium—Metallic, per oz... 2.00
Rhodium—(Metallic), per lb....512.00
Ruthenium—(Metallic), per oz. 112.00
Rubidium—(Metallic), per oz...200.00
Selenium—(Metallic), per oz.. .. 3.00
Sodium—(Metallic) per lb. .. 4.50
Strontium—(Metallic), per oz..128.00
Tantallum—(Metallic) per oz...144.00
Telurium—(Metallic) per oz.... 9 00
Thallium—(Metallic) per oz..... 3.00
Titanium—(Metallic) per oz....32.00
Thorium—(Metallic) per oz.....272.00
Tungsten—(Metallic) per lb..... 1.25
Vanadium—(Metallic), per oz..320.00
Yttrium—(Metallic), per oz 144.00
Zirconium—(Metallic), per oz..240.00

METALS.

Aluminum—
Bronze (10 %), ℔ lb..... 46c.
Copper—
Lake Ingot, Spot, ℔ lb.... 17·75c.
Electrolytic, ℔ lb ..... 16·50c.
Casting Brands, ℔ lb. ... 16½c.
Chili Bars, London, ℔ ton £78 10s.
Sheet Copper (according to size), ℔ lb..... .....25 @38c.
Lead—
Domestic, Common, Spot.. 3·70c.
Foreign ..... 4·70c.
Sheet, ℔ lb, net ..... 7·00c. net
Pipe, ℔ lb ..... 6c. "
Tin lined Pipe, ℔ lb..... 14c. "
Shot, ℔ lb..... 6¼c.
Tin—
Tin Plates .... 13s. 6d.
Tin Spot in London £101 10s
Pig tin, spot in N. Y., ℔ lb.. 22 50c.
Zinc—
Domestic spelter, ℔ lb ... .. 4·90c.
Foreign spelter, ℔ lb... ... 5½c.
Silesian, ton..... £18 5s
Sheet, American, ℔ lb .. .... 6¾c.
Antimony—Hallet's, per lb.. 16½c.
Cookson's, per lb..... ... 14c
Star Antimony..... .... £44
Quicksilver—Per lb..... .....61@63c.
London, ℔ flask..... ..... £7@£7¼

IRON AND STEEL.

New York Prices.

American Pig-Iron.—At tidewater.
No. 1 X..... .....$18.00@$19.00
No. 2 X..... ..... 17.00@ 18.00
Forge. . .. . 16.00@ 16.50
Scotch Pig—Coltness... 21.00@.....
Clyde ..... 19 75@ 20.00
Dalmellington..... 19.75@ 20.00
Summerlee..... .....
Shotts..... .....
Langloan ....
By Cable to-day to the Metal Exchange:
Scotch Warrants.....41s. 2d.
Coltness, at Glasgow ....49s.
Langloan, at Glasgow..... .....49s.
Summerlee, at Glasgow..... .....49s.
Gartsherrie, at Glasgow..... .....47s. 3d.
Glengarnock, at Ardrossan.....47s. 6d.
Dalmellington, at Ardrossan.....42s. 6d.
Eglinton, at Ardrossan .. ..41s. 6d.
Bessemer Pig—
Foreign, nominally..... $19.00@$20.00
Domestic .... 16 00@ 17.00
Spiegeleisen—
German, 20 per cent..... 26.50@ 27.00
English, 20 " " ..... 27.00@ 27.00
" 30 " " ..... 32.00@ 33.00
Ferro Manganese, 80%..... 54.00@ 54.50
Steel Blooms, nominally .....
Steel Billets, " 32.00@ 36.00
Steel Nail Slabs, " 29.00@ 29.50
Steel Wire Rods, " 39.75@ 40.00
Steel Rails—
Heavy sections, at mill.... 26.00@ 28.00
Light " " ..... 30.00@ 32.00
Structural Iron and Steel—
Bridge Plate, at mill.. .....2·0 @2·1c.
Angles, at mill ..... 2·00@2·10c.
Tees, at mill..... .....2·40@2 60c.
Steel Angles, at mill..... .....2¼ @2½c.
Beams and Channels, on wharf, 3·3c.base
Steel Plates—
Tank and Ship, on wharf.....2 25@2·3
Shell, on wharf..... .... 2·4 @2·5
Flange, " ... . 2·6 @2¾
Fire-Box, on wharf..... 3½ @4
Iron Plates—
Common tank, on wharf....2·1@2·2c.
Refined, on wharf..... .....2·3@2·4c.
Shell, " ... .2·3@2·4c.
Flange, " ....3·4@3·5c.
Extra flange, on flange.....3¾@4
Bar Iron—
Refined..... ....1·7 @1·9c.
Common ....1·65@1·80c.
Merchant Steel—
American tool .... 8½@10c.
Special grades..... 13 @20c.
Crucible machinery..... 5 @6c
" spring..... .... 4½c.
Bessemer machinery..... .... 2·2@2·5c
" spring. . ... 2·7@2·9c.
Cast-Iron Pipe—At works:
According to size..... $25 00@$31.00
Wrought-Iron Pipe—nominally—
Butt-Welded, Plain and Tarred, 62½% disc; Galv., 42½% disc.
Lap-Welded, Plain and Tarred, 62½% disc; Galv., 52½% disc.
Boiler Tubes—Per cent disc..60@62½%
Rail Fastenings—
Spikes..... ... ... 2·2@2·25c. delv'd
Angle Fish-bars..... .1 9 @2c.
Bolts and Sq Nuts.....2·9 @3c
" Hex " " .....3·1 @
Wrought Scrap—
Foreign, *ex store*..... @
No. 1 Yard *to vessel*..... 20.50@ 21.50
Cast Scrap .... 15.50@ 16.50
Old Car Wheels..... ... 17.00@ 18.00
Old Rails—Tees ... . 23.00@ 24.00
—Doubles ..... 24.00@ 25 00
Nails—In car-load lots.. .. 1 90@ 2·0c.
—From store.. .... 1·95@ 2.00

Louisville Prices.

Hot Blast Irons—
So. Coke, No. 1..... ....$16.50@$17.00
" " No. 2..... 15 50@ 16.00
" " No. 2½..... 15.00@ 15.25
Mahoning Valley (Lake Ore Mixture)..... ..... 20.50@ 21.00
So. Charcoal, No. 1..... 18.00@ 18.50
" " No. 2..... 17.00@ 17.50
Missouri Charcoal No. 1.... 19.50@ 20.00
" " No. 2.... 19.00@ 19.50
Forge Irons—
Neutral Coke..... ..... $14.75@$15.25
Cold Short ..... 14.25@ 14.75
Mottled..... 12.75@ 13.75
Car Wheel and Malleable Irons—
Southern (standard brands).$22.50@$25.00
" (other brands)..... 18 00@ 18 50
Lake Superior..... .. 22.50@ 23.50

Pittsburg Prices.

Coke or Bituminous Pig—
Foundry No. 1..... .....$17.75@18.00
Foundry No. 2..... ..... 16.75@17.00
Gray Forge No. 3..... ..... 16.00@16.25
" " No. 4.. ... . 15.50@15.75
White .... 15.00@15.50
Mottled..... 15.25@15.50
Silvery .... 16.50@18.50
Bessemer..... ..... 17.25@17.50
Low Phos..... ..... 21.00@21.50
Charcoal Pig—
Foundry No. 1. .... 23.50@24.50
Foundry No. 2..... . . 22.00@24.00
Cold-Blast..... ..... 25.00@27.00
Warm-Blast..... ..... 24.00@25.00
20 p. c. Spiegel..... ..... 27.00@28 00
Muck-Bar..... ..... 29.25@30.00
Steel Blooms..... ..... 29.00@29 50
Steel Slabs .... 28.50@28.75
Steel Crop Ends.... ..... 19.50@19.75
Steel Bloom Ends..... .....@19.50
Ferro Mangarese, 80%.. . .. 54.50@55.00
Steel Billets..... ..... 29.00@29.50
Old Iron Rails..... ..... 25.00@25.25
Old Steel Rails..... ..... 19.00@20.00
No. 1 W. Scrap..... ..... 21.00@21.50
No. 2 W. Scrap.. .... 18.50@19.50
Steel Rails..... ..... 28.00@28.50
" light sections .. .. 28.00@31.00
Bar Iron., nominal..... ..... 1.75@ 1.80
Nails .... $1.90 usual discount
Steel Nails..... ....$1.90
Two per cent off for cash. *At works.

Philadelphia Prices.

Foundry No. 1..... ..... $18.00@19.50
Foundry No. 2..... ..... 17.00@18.00
Gray Forge..... ..... 17.00@16.50
Bessemer Pig..... ..... 19.50@20.50
Steel Rail Blooms..... ..... 29.50 nom
Foreign Bessemer..... .....@20.50
Spiegeleisen. .... 26.50@27.00
Scrap, Selected..... ..... 22.00@23.00
No. 1..... .... 21.00@22.00
Cargo Scrap..... .... 21.00@21.50
Muck-Bars.. ... . 29.00@30.00
Merchant Iron..... . ... 1.75@ 1.95
Plate Iron..... ... 2.00@ 2.10
Tank Iron .... 2.00@ 2.15
Skelp Iron..... ..... 1.95@ 2.00
Angles..... .... 2.00@ 2.10
Beams and Channels..... .. 3.30@.....
Nails..... .. .. 1.90@ 2.00
Steel Rails..... ..... 27.50@29.00
Old Rails..... ..... 23.50@24.00

STOCK MARKET QUOTATIONS

Baltimore, Md.

COMPANY.	Bid.	Asked.
Atlantic Coal....1.35		....
Balt. & N. C.....	.25	.30
Conrad Hill	..	.15
Diamond Tunnel .35@.41		.42@.45
George's Crk. C.10 2¼@10 3¼		110.00
Lake Chrome..	.05	.10
N. State, Balto..	.20	....
Silver Valley....	....	1.00

Highest and lowest prices bid and asked during the week en ding November 26th.

Birmingham, Ala.

COMPANY.	Bid.	Asked.
Ala. Conn. C..	....	27
Bir. Min. & Mfg.	....	160 @170
Bir. Fur. & Mg.	10	16
Broken Arrow C. & M.. ...	....	12¾@ 16
Decat. L. Imp. & Fur	11¼@11¾	11¾@ 12
DecaturMin. L.	. .	23 @ 25
Enterprise Mfg. Co.....	....	50
Jagger-Townley C & C.Co.	5	9
Mag-Ellen C. & Mg	75	100
No Bus. Crk., C. & Mg.	3¾	4¼@ 7½
Sloss I. & S.. ..	....	30 @ 31½
*Sloss I. & S..	87¼@88¼	90½@ 91
Sheffield C. & I.	74	81½@ 85
Tenn. C. & I. Co. 33	@36	....
*Williamson Iron Co.... .	99¾	....
Woodstock S&I	54¼@56	55½@ 57

* Bonds.

Highest and lowest prices bid and asked during the week ending November 26th.

Pittsburg, Pa.

COMPANY.	H.	L.	Closing.
Bridgewater Gas.	80.00	50.00	56.00
Chartiers Val. Gas.	50.00	50.00	50.00
La Noria Mining ..	1.88	1.75	1.88
Manufac's Gas Co.	10.00	10.00	10 00
Nat. Gas of W. Va.	56.00	56.00	56.00
N. Y. & C. Gas Coal.	36.00	36.00	36.00
Ohio Val. Gas. ...	40.00	40.00	40.00
Penn Gas Co ...	20.00	20.00	20.00
Philadelphia Co...	39.75	39.00	39.25
Silverton Mg... ..	1.50	1.50	1.50
Tuna Oil Co.....	60 00	60.00	60.00
Washington Oil...	74.00	71.00	74.00
Westinghouse Air Brake Co....	119.00	118.50	119.00
Westmland & Cam.	39.50	38.00	38.00
Wheeling Gas ...	29.00	27.00	29.00
Yankee Girl Mg..	5.00	5.00	5.00

Highest and lowest prices bid and asked during the week ending November 28th.

Foreign Quotations.

London. November 17.

COMPANY.	Highest.	Lowest
Alturas Gold, Idaho...	5s. 9d.	5s. 3d.
Arizona Copper, Ariz..	18s. 6d.	18s.
Birdseye Creek, Cal....	6s.	5s.
Carlisle, N. Mex	16s. 6d.	15s. 6d.
Colorado United, Colo..	4s	3s.
Columbian, S. A.....	£1⅞	£1¾
Cons. Esmeralda, Nev..	7s.	6s. 6d.
Denver Gold, Colo.....	2s. 6d.	2s.
Dickens Custer, Idaho.	5s.	4s. 6d.
Eberhardt, Nev	1s. 9d.	1s. 3d.
El Callao, Venezuela....	£3¼	£2¾
Empire, Mont	£1⅝	£1⅛
Flagstaff, Utah.....	4s.	3s.
Garfield, Nev.....	15s.	14s.
Gold Hill, N. C.....	1s. 6d.	1s.
Ilex, Cal.....	£¼	£¼
Josephine, Cal	7s. 6d.	5s.
Kohinoor, Colo.....	2s. 6d.	2s. 3d.
Mason & Barry, Portugal	£11⅝	£11⅛
Montana Lt., Mont	£2⅛	£2
New California, Colo...	9s.	8s. 6d.
New Emma, S., Utah...	4s. 3d.	3s. 9d.
New Hoover Hill, N. C.	2s.	1s. 6d.
New La Plata, Colo...	2s. 3d.	2s.
Pittsburg Cons., Nev...	£1⅛	£1
Quebrada, Venezuela...	£6¾	£6⅛
Richmond Con., Nev...	£3¼	£2¾
Ruby & Dunderberg, Nev	2s. 3d.	1s. 9d.
Russell Gold, N. C.....	4s.	3s.
Sierra Buttes, Cal.....	11s. 3d.	8s. 9d.
Stanly, N. C.....	4s.	2s.
U. S. Placer, Colo.....	8s.	7s.
Viola Lt., Idaho	8s.	7s.

Paris * November 15.

El Callao.....	74.00	74.00
Golden River....	395.00	395.00
Lexington.	108.75	108 75
" parts.....	4.75	4 75
Rio Tinto.....	682 50	682.50
" obligations...	516.25	516.25
" " 2d.....	.....	.....
Tharsis	167.50	167.50

* Francs.

DIVIDEND-PAYING MINES.

	Name and Location of Company.		Capital Stock.	Shares. No.	Par	Assessments. Total levied.	Date and amount of last.			Dividends. Total paid.	Date and amount of last.		
1	Adams, s. L.	Colo.	$1,500,000	150,000	$10	*				$555,000	Jan.	1887	.15
2	Alice, s. G	Mont	10,000,000	400,000	25	*				775,000	Dec.	1888	.06¼
3	Alturas, G	Idah.	1,500,000	300,000	5					95,000	Sept	1886	.50
4	Amy & Silversmith, s.	Mon.		341,419						347,530	Aug.	1887	1½
5	Atlantic, C.	Mich	1,000,000	40,000	25	$280,000	Apl.	1875	$1.00	480,000	Aug.	1888	1.50
6	Argenta, s	Nev.	10,000,000	100,000	100	325,000	July	1885	.10	40,000	Feb.	1880	.20
7	Aspen Mg. & S., s. L.	Colo.	2,000,000	200,000	10	*				40,000	Nov.	1888	.20
8	Aurora, L.	Mich.	2,000,000	100,000	20	*				155,000	Oct.	1887	1.87½
9	Bassick, G. S.	Colo.	10,000,000	100,000	100					400,000	Mar.	1884	1.00
10	Belle Isle, s.	Nev.	10,000,000	100,000	100	145 000	Feb	1887	20	300,000	Jan	1887	.95
11	Belcher, G. S.	Nev.	10,400,000	104,000	100	2,770,000	Sept	1888	.50	15,397,200	Apl	1876	1.00
12	Bellevue Idaho, s. L.	Idah.	1,250,000	125,000	10	57,500	Nov.	1887	25	187,500	Jan	1887	10
13	Black Bear, G.	Cal..	3,000,000	30,000	100	92,500	Dec.	1884	.25	895,000	May	1883	.20
14	Bodie Con., G. S.	Cal.	10,000,000	100,000	100	500,000	Sept	1888	.50	1,295,000	Apl.	1885	.50
15	Bonanza Developm't	C & M	3,000,000	300,000	10					135,000	Oct.	1882	.15
16	Bonanza K'g. Cons. s.	Cal..	1,000,000	100,000	10	*				185,000	Feb.		.20
17	Boston & Mont, G.	Mon	2,500,000	250,000	10	*				520,000	Jun.	1886	.15
18	Boston & Mont., C. S	Mon	2,500,000	100,000	25	*				400,000	Nov.	1888	2.00
19	Bres ce, s.	Colo	,000,000	200,000	25	*				2,000	Feb.	1880	.01
20	Brooklyn Lead, L. S.	Utah	500,000	50,000	10					127,000	July	1887	.05
21	Bulwer, G.	Cal..	10,000,000	100,000	10	80,000	May	1888	.20	175 000	Jan.	1884	.10
22	Caledonia, G.	Dak.	10,000,000	100,000	100	505,000	May	1886	.15	48,000	Nov.	1888	.08
23	Calumet & Hecla, C.	Mich	2,500,000	100,000	25	1,200,000	..			31,350,000	Dec.	1888	5.00
24	Carbonate Hill s. L.	Colo.	1,500,000	200,000	10	*				80,000	Apl.	1884	.05
25	Castle Creek, G.	Idah.	100,000	100,000	1					51,000	Oct.	1883	.03
26	Catalpa, s. L.	Colo.	3,000,000	3 0,000	10	*				270,000	May.	1884	.10
27	Central, C.	Mich	500,000	20,000	25	100,000	Sept	1861	.06	1,890,000	Aug.	1888	1.50
28	Chrysolite, s. L.	Colo.	10,000,000	200,000	50	*				1,650,000	Dec.	1884	.25
29	Colorado Central, s. L.	Colo.	2,750,000	275,000	10	*				351,000	Dec.	1888	.05
30	Confidence, s. L.	Nev..		24,860		287,440	Apl.	1887	.50	174,720	Aug.	1888	1.00
31	Cons. Cal. & Va., G. & S.	Nev.	21 600 000	216,000	100	108,000	Jan.	1885	.20	2,440,800	Nov.	1888	.50
32	Contention, s	Ariz.	12,500,000	250,000	50					2,587,000	Dec.	1884	.25
33	Cop. Queen Cons, C.	Ariz.	1,400 000	140,000	10					140,000	Oct.	1888	.50
34	Crescent, s. L. G.	Utah	15,000,000	600,000	25					228,000	Oct.	1888	.18
35	Crown Point, G. S.	Nev.	10,000,000	100,000	100	2,825,000	Oct.	1888	.50	11,588,000	Jan.	1875	2.00
36	Daly, s. L.	Utah	3,000,000	150,000	20					825,000	Nov	1887	.25
37	Deer Creek, S.	Idah.	1 000,000	200,000	5	*				10,000	Oct.	1888	.05
38	Deadwood-Terra, G.	Dak.	5,000,000	200,000	25	*				$1,000,000	Nov.	1887	.10
39	Derbec B. Grav., G. S.	Cal..	10,000,000	100,000	100	90,000	Dec.	1881	.10	180,000	May	1887	.10
40	Dunkin, s. L.	Colo.	5,000,000	200 000	25	*				345,000	Oct.	1888	.05
41	Eclipse	Colo.	100,000	100,000	1					20,000	Nov.	1887	.10
42	Elkhorn, G. S.	Mont	1,000,000	100,000	10	50,0 0	July	1883	.50	170,900	July	1887	.05
43	Empire Lt., G.	Mont	500,000	100,000	5	*				70,000	Oct.	1887	.37½
44	Eureka Con., G. S. L.	Nev..	5,000,000	50,000	100	500,000	July	1886	1.00	4,918,500	July	1888	.25
45	Evening Star, s. L.	Colo.	500,000	50,000	10	*				1,400,000	Nov.	1883	.50
46	Excelsior, G.	Cal..	10,000,000	100,000	100	560,000	Sept	1885	1.00	875,000	Oct.	1880	.25
47	Father de Smet, G.	Dak.	10,000,000	100 000	100	200,000	Nov	1878	1.00	1,125,000	Dec.	1885	.20
48	Franklin, C.	Mich	1,000,000	40,000	25	320,000	Jun.	1871		720,000	July	1888	2.00
49	Freeland, G. S. C.	Colo.	5,000,000	200,000	25	*				190,000	July	1888	.10
50	Fresno Enterprise, G	Cal..	5,000,000	100,000	50			Mch	1883	110,000	July	1882	.10
51	Garfield Lt., G. S.	Nev.	500,000	100,000	5					85,000	Apl.	1888	.12½
52	Golconda, G. S.	Idah.	1,000,000	100,000	10					120,000	May	1888	.60
53	Gould & Curry, G. S.	Nev..	10,800,000	108,000	100	5,355,000	Oct.	1888	.50	3,826,800	Oct.	1870	10.00
54	Grand Central, S.	Ariz.	1,000,000	100,000	10					625,000	Dec	1882	.25
55	Grand Prize, S.	Nev..	10,000,000	100,000	100	595,000	Oct.	1888	.25	495,000	Mar	1884	.25
56	Granite, S.	Colo.	125,000	125,000	1					6,250	May	1883	.01
57	Granite Mountain, s.	Mont	10,000,000	400,000	25					5,200,000	Oct.	1888	.50
58	Green Mountain, G.	Cal..	1,250,000	125,000	10					212,000	Nov.	1881	.07½
59	Hale & Norcross, G. S	Nev..	11,200,000	112,000	100	5,086,000	July	1887	.50	1,822,000	Aug.	1888	.50
60	Hecla Con., S. G. L. C.	Mont	1,500,000	30,000	50					1,197,500	Aug.	1888	.50
61	Hel'a Mg & Red, G. & L.	Mont	3,315,000	663,000	5					197,970	July	1886	.06
62	Holmes, S.	Nev..	10,000,000	100,000	100	300,000	Sept	1885	10	75,000	Apl	1886	.25
63	Holyoke, G.	Idah.	200,000	200,000	1					97,000	Feb.	1883	.10
64	Homestake, G.	Dak.	12,508,000	125,000	100	200,000	July	1878	1.00	4,288,750	Nov.	1888	.20
65	Honorine, s. L.	Utah	500,000	250,000	2	35,000	Jun.	1883		125,000	Sept	1887	.05
66	Hope, s.	Mont	1,000,000	100,000	10	*				233,252	Apl.	1858	.25
67	Horn-Silver, s. L.	Utah	10,000,000	400,000	25	*				4,000,000	Nov.	1884	.50
68	Hubert, G.	Colo.	500,000	50,000	10	*				239,500	Oct.	1888	.11
69	Idaho, G.	Idah.	310,000	3,100	100					4,966,750	Sept	1888	7.50
70	Ideal, s. L.	Colo.	1,500,000	50,000	10					15,000	Oct.	1886	.05
71	Illinois, s.	N. M.	100,000	100,000	1	*				25,000	Jan.	1887	.25
72	Independence, S.	Nev..	10,000,000	100,000	100	340,000	Oct.	1886	.20	225,000	Sept	1879	.25
73	Indian Queen, S.	Nev..	250,000	125,000	2					368,750	July	1883	.03
74	Iron Hill, S.	Dak.	2,500,000	250,000	10	118,750	Sept	1888	.03	156,250	Nov.	1887	.07½
75	Iron-Silver, s. L.	Colo.	10,000,000	500,000	20	*				2,400,000	Dec.	1888	.20
76	Jackson, G. S.	Nev..	10,000,000	50,000	100	10,000	Nov	1880	.20	45,000	Oct.	1886	.10
77	Jay Gould	Mont	2,000,000	4 000	5	*				267,000	Jun.	1888	.09
78	Jocuistits, S.	Mex.	2,500,000	250,000	10					1,200,000	Feb.	1885	.50
79	Jumbo, G.	Colo.	3,000,000	300,000	10					35,000	Oct.	1887	.02½
80	Kentuck	Nev..	3,000,000	30,000	100	342,000	Nov	1881	.30	1,350,000	Dec.	1886	.10
81	La Plata, S. L.	Colo.	2,000,000	200,000	10	*				610,000	Sept	1882	.30
82	Leadville Cons, S. L.	Colo.	4,000,000	400,000	10	*				423,000	Apl.	1887	.05
83	Lexington, G. S.	Mont	4,000,000	400,000	10	*				565,000	Jan.	1885	2.00
84	Little Chief, S. L.	Colo.	10,000,000	200,000	50	*				800,000	July	1888	.10
85	Little Pittsburg, s. L.	Colo.	20,000,000	200,000	100	*				1,050,000	Mch.	1880	.50
86	Manhattan, S.	Nev	5,000,000	50,000	100	250,000	Dec.	1887	1.00	437,500	Feb	1886	.25
87	Marion Bullion, G	N.C.	500,000							15,000	Jan.	1886	
88	Martin White, S.	Nev..	10,000,000	100,000	100	1,150,000	Mar.	1886	25	140,000	Dec.	1886	.25
89	Mary Murphy, G.	Mont	350,000	3,500	100	*				122,500	Feb.	1888	5.00
90	Minnesota, C.	Mich	1,000,000	40,000	25	420,000	Apl.	1886	1.00	1,826,000	Mar.	1870	
91	Mono, G.	Cal.	5,000,000	50,000	100	641,000	Sept	1888	.50	12,500	Mar.	1886	.25
92	Montana, Lt., G. S.	Mont	3,300,000	660,000	5	*				2,149,035	Oct.	1888	.06¼
93	Morning Star, s. L.	Colo.	1,000,000	100,000	10					775,000	Mar.	1888	.25
94	Moulton, S. G.	Mont	2,000,000	400,000	5	*				380,000	Dec.	1887	.07½
95	Mount Pleasant, G.	Cal.	150,000	150,000	1	*				150,000	Feb.	1887	.30
96	Mt. Diablo, S.	Nev..	5,000,000	50,000	100	137,500	Jun.	1880	2.00	120,000	Aug.	1888	.20
97	Napa, G	Cal..	700,000	100,000	7					290,000	Jan.	1883	.10
98	Navajo, G. S.	Nev..	10,000,000	100,000	100	485,000	Apl.	1888	.30	325,000	Feb.	1885	.25
99	N. Hoover Hill, G. S.	N. C.	300,000	120,000	2½	*				30,000	Dec.	1845	.06½
100	Northern Belle, S.	Nev..	5,000,000	50,000	100	425,000	Jan.	1884	8.00	2,400,000	Apl.	1883	.50
101	North Belle Isle, S.	Nev..	10,000,000	100,000	100	300,000	Oct	1888	.50	230,000	May	1888	.50
102	North Star, G.	Cal..	1,000,000	100,000	10					100,000	Oct.	1888	.50
103	Ontario, S. L.	Utah	15,000,000	150,000	100					9,650,000	Nov.	1888	.50
104	Opnir, G. S.	Nev..	10,000,000	100,000	100	4,109,440	Sept	1888	.50	1,565,800	July	1882	1.00
105	Original, S. C.	Mont	1,500,000	60,000	25					120,000	Apl.	1888	.05
106	Osceola, C.	Mich	1,250,000	50,000	25	480,000	Apl.	1876	1.60	1,172,500	Sept	1888	1.00
107	Oxford, G.	N. S.	125,000	125,000	1	*				38,500	Oct.	1885	.02
108	Paradise Valley, G. S	Nev.	10,000,000	100,000	100	63,000	Apl.	1888	.15	150,000	Apl.	1887	.10
109	Parrott, G.	Mont	1,800,000	180,000	10					282,000	Nov.	1888	.20
110	Peacock, S. C.	N.M.	2,000,000	200,000	10					60,000	Nov.	1886	
111	Pleasant Valley, G. S.	Cal..	10,000,000	100,000	100	10,000	Mar.	1884	.10	30,000	Dec.	1887	.05
112	Plutus, G. S. C. L.	Colo.	2,000,000	200,000	10	*				20,000	Feb.	1886	.10
113	Plymouth Con., G.	Cal..	5,000,000	100,000	50	*				2,280,000	Feb.	1888	.40
114	Prussian, s. L.	Colo.	1,500,000	150,000	10					132 000	Jan.	1883	.10
115	Quicksilver, pref., G.	Cal..	4,300,000	43,000	100					1,471,442	Oct.	1888	1.25
116	" " com., G.	Cal..	5,700,000	57,000	100					151,000	July	1882	.40
117	Quincy, C.	Mich	1,000,000	40,000	25	200,000	Dec.	1862		4,970,000	Aug.	1888	5.00
118	Richmond, S. L.	Nev..	1,350,000	54,000	25	*				4,312,500	Jun.	1887	1.25
119	Ridge, C.	Mich.	500,000	20,000	25	219,939	Mar	1886	.50	99,785	Feb.	1880	.50
120	Rising Sun, s.	Dak..	750,000	150,000	5	*				52,000	May	1881	.07½
121	Robinson Con., S. L.	Colo.	10,000,000	200,000	50	*				585,000	Mar.	1886	.05
122	Robert E. Lee, s. L.	Colo	10,000,000	500,000	20					100,000	Dec.	1852	.50
123	Rooks, G.	Vt..	500,000	50,000	10	*				61,000	Apr	1885	.40
124	Savage, S.	Nev.	11,200,000	112,000	100	6,436,000	Oct	1888	.50	4,460,000	July	1889	3.00
125	Security L. Mg., Mfg.	Colo.	1,000,000	100,000	10					50,000	July	1884	
126	Shoshone, G.	Idah.	150,000	150,000	1					7,500	Apl	1883	.01
127	Sierra Buttes, G.	Cal..	2,225 000	122,500	10					1,492,557	Apl.	1888	.12½
128	Sierra Nevada, G. S.	Nev..	10,000,000	100,000	100	6,150,000	Nov	1888	.25	102,000	Jan.	1871	1.00
129	Sierra Nevada, s. L.	Idaho	1,000,000	1	1	*				20,000	June	1888	.01
130	Silver Cord, G. S. L.	Colo.	5,000,000	500,000	10					225,000	Nov.	1883	.25
131	Silver King, S.	Ariz.	10,000,000	500,000	100	50,000	Jun.	1888	.50	1,950,000	July	1887	.25
132	Silver Mg. of L. V.	N. M.	500,000	500,000	1					25,000	June	1883	.05
133	Silverton, G. S. L.	Colo.	2,000,000	200,000	10	*				80,000	Nov.	1886	.02
134	Small Hopes Cons., S.	Colo.	5,000,000	250,000	20	*				3,112,500	Dec.	1887	.20
135	Smuggler, S. L.	Colo.	600,000	60,000	10					66,700	Aug.	1883	.25
136	Spring Valley, G.	Cal..	200,000	200,000	1	50,000	Oct.	1886	.25	50.000	Jan	1881	.25
137	Standard, G. S.	Cal..	10,000,000	100,000	100	25,000	Oct.	1884	.25	8,595,000	Jun.	1888	.05
138	Stormont, S.	Utah	500,000	500,000	1	*				155,000	Nov	1881	.05
139	St. Joseph, L.	Mo..	1,500,000	150,000	10	*				844,000	Dec	1887	.30
140	Surinam, G.	D. G.	3,000,000	600,000	5					105,000	Nov.	1887	.05
141	Swansea, G.	Colo.	600,000	60,000	10	*				9,000	Apl.	1888	.02½
142	Syndicate, G.	Cal..	10,000,000	100,000	100	38,729	July	1882	.15	48,308	Sept	1885	.10
143	Tamarack, C.	Mich.	1,000,000	40,000	25	520,000	Apl.	1885	3.00	440,000	Oct.	1888	5.00
144	Tip Top, S.	Ariz.	10,000,000	100,000	100	250,000	Sept	1883	.25	100,000	Nov.	1881	.20
145	Tombstone, G. S. L.	Ariz.	12,500,000	500,000	25	*				1,250,000	Apl.	1882	.10
146	United Verde, C.	Ariz.	3,000,000	300,000	10	*				97,500	Feb.	1884	.20
147	Valencia, M.	N. H.	150,000	1,500	100	*				37,500	Apl	1886	2.50½
148	Viola Lt., s. L.	Idah.	750,000	150,000	5	*				272,500	Oct.	1888	.37½
149	Yankee Girl	Colo.	2,500,000	250,000	10	*				1,275,000	July	1887	.10
150	Yellow Jacket, G. S.	Nev..	12,00000	120,000	100	5,448.000	Dec	1885	.75	2,184,000	Aug	1871	1.50

NON-DIVIDEND-PAYING MINES.

	Name and Location of Company.		Capital Stock.	Shares. No.	Par Value.	Assessments. Total levied.	Date & am't of last.		
1	Agassiz Cons., s. L.	Colo.	$2,500,000	50.000	$50	*			
2	Alloues, C.	Mich	2,000,000	80,000	25	$657.000	Jun	1888	1.00
3	Alpha Con., G. S.	Nev..	3,000,000	30,000	100	562.500	Nov.	1888	87½
4	Alta, s.	Nev..	10,080,000	100,800	100	2,241,600	Sept	1888	.50
5	Amador, G.	Cal..	400,000	200,000	2	*			
6	American Flag, s.	Colo.	1,250,000	125,000	10	300,000	Jun	1877	.50
7	Anglo-Montana, Lt.	Mon.	600,000	120,000	5	*			
8	Appalachian, Lt., G.	N. C.	1,500,000	300,000	5				
9	Barcelona, G.	Nev..	5,000,000	200,000	25	*			
10	Bechtel Con., G.	Cal..	10,000,000	100,000	100	173,500	Jan.	1888	.10
11	Belmont, S.	Nev..	5,000,000	50,000	100	735,000	Apl.	1888	.10
12	Best & Belcher, G. S.	Nev.	10,080,000	100,800	100	2,054,500	Oct.	1888	.25
13	Big Pittsburg, s. L.	Colo.	20,000,000	200,000	100	*			
14	Bi-Metallic, S.	Mon.	5,000,000	200,000	25	*			
15	Black Oak, G.	Cal..	3,000,000	300,000	10	*			
16	Boston Con., G.	Cal..	10,000,000	100,000	100	170,000	Nov	1883	.25
17	Bremen, S.	Nev..	500,000	500,000	10	*			
18	Brunswick, S.	Cal..	2,000 000	400,000	5	*			
19	Bullion, G. S.	Nev..	10,000,000	100,000	100	4,007,000	Aug.	1888	.50
20	Bve and Bye	Ariz.	1,000,000	100,000	10	*			
21	Calaveras, G.	Cal..	500,000	500,000	1	*			
22	Carisa, G.	Wy.	500,000	100,000	5	*			
23	Carupano, G. & L. C.	Ven.	200,000	100,000	2	*			
24	Cashier, G. S.	Colo.	500,000	250,000	2	*			
25	Cen. Contin'l, G. & L. C. & A.	Colo.	2,000,000	200,000	10	*			
26	aries Dickens, G. S.	Idah.	1,250,000	250,000	5	*			
27	Cherokee, G.	Cal..	1,500,000	150,000	10				
28	Chollar, S.	Nev..	11,200,000	112,000	100	1,320,000	Oct.	1888	.50
29	Cinnamon Mt., G. S.	Colo	750,000	150,000	5	*			
30	Cleveland, T.	Dak.	1,000,000	500,000	2	*			
31	Coichis.	N. M.	500,000	500,000	1				
32	Comstock, G. S.	Nev..	10,000,000	100,000	100	30 000	Mar.	1887	.15
33	Con. Imperial, G. S.	Nev..	5,000,000	50,000	100	1,175,000	Sept	1887	.25
34	Con. Pacific, G.	Cal..	6,000 000	60,000	100	177,000	Sept	1887	.10
35	Cons. Silver, S.	Mo..	2,500,000	250,000	10				
36	Courtlandt.	Colo.	500,000	50,000	10	*			
37	Crescent, S. L.	Colo.	3,000,000	300,000	10	*			
38	Crocker, S.	Ariz.	10,000,000	100,000	100	105,000	Feb.	1888	.20
39	Crowell, G.	N. C	500,000	500,000	1	*			
40	Dahlonega, G.	Ga..	250,000	250,000	1	*			
41	Dandy, S.	Colo.	5,000,000	500,000	10				
42	Dardanelles, G.	Cal..	1,000,000	100,000	10	*			
43	Decatur, S.	Colo.	1,500,000	300,000	5	*			
44	Denver City, S. L.	Colo.	5,000,000	500,000	10	*			
45	Denver Gold, G.	Colo.	300,000	60,000	5	*			
46	Durango, G.	Colo.	500,000	500,000	1	*			
47	Eastern Dev. Co., Lt.	N. S.	1,500,000	150 000	10	990,000	Mar.	1886	1.00
48	El Cristo, G. S.	U.S.C	1,000,000	500,000	2	*			
49	El Dorado, G	Cal..	1,000,000	250,000	4	*			
50	El Taiman, G.	U.S.C	1,000,000	500,000	2	*			
51	Empire, S.	Utah	10,000,000	100,000	100	*			
52	Eureka Tunnel, s. L.	Nev..	10,000,000	100,000	100	*			
53	Exchequer.	Nev.	10,000,000	100,000	100	790.000	Sept	1888	.20
54	Found Treasure, G. S.	Nev..	10,000,000	100,000	100	18,000	July	1882	.06
55	Gogebic L. Syn., I.	Mich.	5,800,000	200,000	25				
56	Gold Cup, S.	Colo.	500,000	500,000	1	*			
57	Golden Era, G.	Mon.	2 000,000	200,000	10	*			
58	Gold Placer, G.	Colo.	5,000,000	200,000	25	229,314	Dec.	1885	.25
59	Gold Rock, G.	Cal.	1,000,000	500,000	2	*			
60	Goodshaw, G.	Cal..	10,000,000	100,000	100				
61	Grand Belt, C.	Tex.	12,000,000	120,000	100				
62	Graud Duke	Colo.	800,000	80,000	10				
63	Grand Romance, G.	U.S.C	1,000,000	500,000	2	*			
64	Gregory-Bobtail, G.	Colo.	550,000	550,000	1	*			
65	Gregory Con., G.	Mon.	3,000,000	300,000	10				
66	Harlem M. & M. Co, G.	Cal..	1 000,000	200,000	5				
67	Head Cent. & Tr. s. G.	Ariz.	10,000,000	100,000	100				
68	Hector, G.	Cal..	1,500,000	300,000	5				
69	Highland, C.	Mich	500,000	25,000	25				
70	Hollywood.	Cal..	200,000	100,000	2				
71	Hortense, S.	Colo.	2,000,000	200,000	10				
72	Huron, C	Mich	1,000,000	40,000	25	280,000	May	1887	3.00
73	Iron Gold & Silver, S	N. M.	2,000,000	200,000	10	*			
74	Ironton, I.	Wis.	1,000,000	40,000	25				
75	Iroquois, C	Mich	1,250,000	50,000	25				
76	J. J. Reymert.	Ariz.	10,000,000	100,000	100	*			
77	Julia Cons., G. S.	Nev..	11,000,000	110,000	100	1,650,000	Apl.	1887	.10
78	Kcarsarge, C.	Mich	1 250,000	50,000	25	190,000	Oct.	1887	1.00
79	Lacrosse, G.	Colo.	1 000,000	100,000	10	*			
80	Lee Basin, s. L.	Colo.	5,000,000	500,000	10	*			
81	Lucerne, S.	Colo.	5,000,000	500,000	10	*			
82	Mammoth Bar., G.	Cal..	10,000,000	100,000	100	50,000	Dec.	1881	
83	May Belle, G.	Cal..	10,000,000	100,000	100	84,000	Mar.	1884	.15
84	Mayflower, Gravel.,	Nev..	1,000,000	100,000	10	425,000	July	1888	.50
85	Medora, G.	Dak.	250,000	250,000	1				
86	Mexican, S.	Nev..	10,000,000	100,000	100	2,725,760	Aug.	1885	.25
87	Middle Bar G.	Cal..	400,000	200,000	2	*			
88	Mike & Starr, s. L.	Colo.	1,000,000	200,000	5	*			
89	Monitor, G.	Colo.	100,000	100,000	1	*			
90	Montana Silver, S.	Mont	3,000,000	300,000	10	*			
91	Native, C.	Mich	1,000,000	40,000	25	*			
92	Neath, G.	Colo.	1,000,000	100,000	10	*			
93	Nevada Queen, S.	Nev	10,000,000	100,000	100	130,000	Dec.	1887	.50
94	New Germany, G	N. S.	100,000	100,000	1	*			
95	New Pittsburg, s. L.	Colo.	2,000,000	200,000	10	*			
96	North Standard, G.	Cal..	19,000,000	100,000	100	20,000	Nov		
97	Noonday.	Cal..	600,000	60,000	10	208,000	Dec.	1881	.10
98	Oneida Chief, G.	Cal..	500,000	125,000	4	*			
99	Oriental & Miller, s.	Nev..	10,000,000	400,000	10	*			
100	Osceola, G.	Nev..	5,000,000	50,000	25	*			
101	Overman, G. S.	Nev.	11,520,000	115,200	100	3,737,180	Aug.	1887	.25
102	Park, S.	Utah	2,000,000	200,000	100	*			
103	Peer, S.	Ariz.	10,000,000	100,000	10	135,000	Nov.	1886	.10
104	Peerless, S.	Ariz.	10,000,000	100,000	100	345,000	Apl.	1888	.25
105	Phenix, Ariz.	Ariz.	500,000	500,000	100				
106	Phenix, G. S.	Ark.	5,000,000	200,000	1	*			
107	Phenix Lead, S. L.	Colo.	100,000	100,000	25	*			
108	Pilgrim, G.	Cal..	600,000	300,000	1	*			
109	Potosi, S.	Nev..	11,200,000	112,000	2	1,349,600	July	1888	.50
110	Proustite, S.	Idah	250,000	250,000	100	*			
111	Puritan, S. G.	Cal..	1,500,000	300,000	5	*			
112	Quincy.	Colo.	3,000,000

NEW YORK MINING STOCKS QUOTATIONS.

DIVIDEND-PAYING MINES.

NAME AND LOCATION OF COMPANY.	Nov. 24.		Nov. 26.		Nov. 27.		Nov. 28.		Nov. 29.‡		Nov. 30.		SALES.
	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	
Adams, Colo.	.50	.....	....	....	50	....	.....	.....	.....	.....	.....	.....	1,300
Alice, Mont	.....	.....	....	....	.....	....	1.00	.....	.....	.....	1 00	.....	1,500
Argenta, Nev.	.....	.....	....	....	.....	....	.....	.....	.....	.....	.....	.....	.....
Bassick, Colo.	.....	.....	.....	....	.....	....	.....	.....	.....	.....	.....	.....	.....
Belcher, Nev	.....	.....	....	....	.....	....	.....	.....	.....	.....	6 25	..	100
Belle Isle, Nev.	.....	.....	.....	....	.....	....	.....	.....	.....	.....	.....	.....	.....
Bodie Cons., Cal.	.....	.....	1.75	....	1.95	....	.....	.....	.....	.....	.....	.....	600
Breece, Colo	.....	.....	.....	....	.....	....	.....	.....	.....	.....	.....	.....	.....
Bulwer, Cal	.....	.....	.....	....	.....	....	.....	.....	.....	.....	.....	.....	.....
Caledonia, Dak	.....	.....	.....	....	.....	....	3.50	.....	.....	.....	.....	.....	100
Calumet & Hecla	.....	.....	.....	....	.....	....	.....	.....	.....	.....	307½	26 0	30
Cholla, Nev	.....	.....	.....	....	.....	....	.....	.....	.....	.....	4 25	..	200
Chrysolite, Colo.	.....	.....	.....	....	.....	....	.....	.....	.....	.....	.....	.....	.....
Colorado Cent'l, Colo.	.....	.....	.....	....	.....	....	.....	.....	.....	.....	.....	.....	.....
Cons. Cal. & Va., Nev.	10.75	.....	11.75	11.63	11.50	11 00	.....	.....	.....	.....	11.25	.....	1,350
Crown Point, Nev	.....	.....	.....	....	.....	....	.....	.....	.....	.....	.....	.....	.....
Deadwood, Dak.	.....	.....	.....	....	.....	....	.....	.....	.....	.....	.....	.....	.....
Dunkin, Colo.	.....	.....	.....	....	.....	....	.....	.....	.....	.....	.95	....	500
Eureka Cons., Nev	.....	.....	.....	....	.....	....	.....	.....	.....	.....	.....	.....	.....
Father de Smet, Dak	.....	.....	.....	....	.....	....	.....	.....	.....	.....	.....	.....	.....
Freeland, Colo.	.....	.....	.....	....	.....	....	.....	.....	.....	.....	.....	.....	.....
Gould & Curry, Nev.	.....	.....	.....	....	.....	....	.....	.....	.....	.....	.....	.....	.....
Grand Prize, Nev.	.....	.....	.....	....	.....	....	.....	.....	.....	.....	.....	.....	.....
Hale & Norcross, Nev	.....	.....	.....	....	.....	....	6.63	.....	.....	.....	6.50	.....	115
Holyoke, Idaho	.06	.....	.....	....	.06	....	.06	.....	.....	.....	.....	.....	1,200
Homestake, Dak.	.....	.....	.....	....	.....	....	12.00	.....	.....	.....	.....	.....	50
Horn-Silver, Ut.	.....	.....	.....	....	.90	....	.....	.....	.....	.....	.....	.....	100
Iron Hill, Dak.	.....	.....	.....	....	.....	....	.....	.....	.....	.....	.....	.....	.....
Iron Silver, Colo.	.....	.....	.....	....	.....	....	.....	.....	.....	.....	.....	.....	.....
Leadville C., Colo.	.....	.....	.....	....	.....	....	.....	.....	.....	.....	.....	.....	.....
Little Chief, Colo.	.22	.....	.....	....	.....	....	.....	.....	.....	.....	.....	.....	500
Little Pittsburg, Colo	.....	.....	.....	....	.....	....	.....	.....	.....	.....	.....	.....	.....
Martin White, Nev.	.....	.....	.....	....	.....	....	.....	.....	.....	.....	.....	.....	.....
Mono, Cal	.....	.....	.....	....	1.45	....	.....	.....	.....	.....	.....	.....	200
Mount Diablo, Nev.	.....	.....	.....	....	.....	....	.....	.....	.....	.....	.....	.....	.....
Navajo, Nev	.....	.....	2.55	....	2.60	2.55	.....	.....	.....	.....	2.60	.....	600
North Belle Isle, Nev.	.....	.....	.....	....	.....	....	.....	.....	.....	.....	.....	.....	.....
North Star, Cal.	.....	.....	6.50	....	.....	....	6.63	6.50	.....	.....	.....	.....	620
Ontario, Ut.	.....	.....	.....	....	.....	....	33.50	.....	.....	.....	.....	.....	30
Ophir, Nev.	.....	.....	.....	....	.....	....	7.88	.....	.....	.....	.....	.....	100
Plutus, Colo.	.85	.....	.85	....	.85	....	.85	.....	.....	.....	.85	.....	2,900
Plymouth, Cal.	.....	.....	9.75	9.50	.....	....	9.75	9.25	.....	.....	10.25	.....	600
Quicksilver Pref., Cal	36.00	.....	.....	....	.....	....	.....	.....	.....	.....	.....	.....	100
" Com., Cal	...	.....	7.00	6.88	.....	....	7.00	.....	.....	.....	.....	.....	370
Robinson Cons. Colo.	.....	.....	.....	....	.....	....	.....	.....	.....	.....	.....	.....	.....
Savage, Nev	.....	.....	.....	....	.....	....	.....	.....	.....	.....	.....	.....	.....
Sierra Nevada, Nev.	.....	.....	.....	....	4.05	....	.....	.....	.....	.....	.....	.....	100
Silver King, Ariz.	1.00	.....	1.00	.90	1.00	.88	1.05	.95	.....	.....	1.10	.99	2,580
Silver Mg. of L. V.	.....	.....	.....	....	.....	....	.....	.....	.....	.....	.30	.28	1,500
Small Hopes, Colo.	.....	.....	.....	....	.....	....	.75	.70	.....	.....	.....	.....	200
Standard, Cal.	.....	.....	.....	.....	1.60	....	1.60	.....	.....	.....	1 60	.....	400
Stormont, Utah	.05	.....	.....	.....	.....	....	.....	.....	.....	.....	.....	.....	500
Yellow Jacket	.....	.....	5.88	.....	6 00	....	.....	.....	.....	.....	5 00	.....	300

NON-DIVIDEND-PAYING MINES.

NAME AND LOCATION OF COMPANY.	Nov. 24		Nov. 26.		Nov. 27.		Nov. 28.		Nov. 29.§		Nov. 30		SALES.
	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	
Alloucz, Mich.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	4 38	4.13	12
Amador, Cal.	2.35	...	2.25	.....	2.25	....	2.25	....	.....	.....	2.25	.....	1,70
Am'can Flag, Colo.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Astoria, Cal.	.25	.24	.24	.....	.24	....	.25	.24	.....	.....	.24	...	6,700
Barcelona, Nev.	.....	.....	.74	.....	.68	.....	.....	.....	.....	.....	.....	.....	400
Bechtel, Cal.	...	...	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Belcher, Nev.	.....	.....	.....	.....	.....	.....	7.13	.....	.....	.....	.....	.....	100
Brunswick, Cal.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Buffalo Iron Min'g.	6.50	6.25	6.50	6.25	6.50	6.25	6.63	6.25	.....	.....	6.50	6.38	2,600
Bullion, Nev.	2.10	..	2.05	..	2.05	....	2.10	.....	.....	.....	2.05	....	600
Cashier, Colo	.10	.....	.10	.09	.09	.....	.....	.....	.....	.....	.....	.....	3,100
Castle Creek, Id.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Central Arizona	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Cleveland, Dak.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Colchis, N. M.	2.15	2.05	2.15	....	2.05	....	2.25	2.15	.....	.....	2.20	....	1,250
Columbia & Beaver	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Con. Imperial, Nev	.....	.....	1.15	....	1.05	....	1.00	.....	.....	.....	.....	.....	1,900
Con Pacific	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Denver City, Colo.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.12	.11	1,000
Eastern Oregon	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
El Cristo, U. S. Col.	.....	.....	.60	....	.70	.60	.74	.73	.....	.....	.75	....	1,800
Excelsior, Cal	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Exchequer, Nev.	2.00	....	1 90	....	1.90	....	2.00	.....	.....	.....	1.90	....	900
Hollywood, Cal.	.40	....	.41	.40	.40	....	.41	.40	.....	.....	.40	....	6,700
Huron, Mich.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Julia, Nev.	.55	....	.50	...	.....	....	.55	.....	.....	.....	.55	....	1,100
Kings't'n & Pemb'ke	.....	.....	.....	...	.....	....	1.00	.....	.....	.....	.....	.....	500
Kossuth, Nev.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Lacrosse, Colo	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Lee Basin, Colo.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Mexican, Nev.	.....	.....	5.13	....	.....	....	.....	.....	.....	.....	4.80	....	250
Middle Bar, Cal.	.42	...	.43	....	.41	.....	.40	.....	.....	.....	.39	....	2,900
Monitor, Colo.	.05	.04	.04	..	.....	....	.....	.....	.....	.....	.....	...	4,600
N'th Standard, Cal	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Oriental & Miller	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Phœnix Lead, Colo.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Phœnix of Ark.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Rappahann'k, Va.	.10	...	.10	....	.10	....	.10	.....	.....	.....	.10	....	4,200
San Sebastian, S'nS	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Santiago, U. S. Col.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Shoshone, Idaho	.....	.....	.....	.....	.05	....	.....	.....	.....	.....	.....	.....	700
Silver Cliff, Colo	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Silver Cord, Colo.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Silver Queen, Ariz.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
State Line I.&M, Nev	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
" " S.&S. "	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Sutro Tunnel, Nev.	.10	.....	.....	.....	.....	.....	.10	.09	.....	.....	.11	.....	4,700
" Trust Cert.	.66	.....	.....	.....	.....	.....	.70	.66	.....	.....	.70	.67	7,300
Sutter Creek, Cal.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
SylvaniteM. & M. Col	3.15	3.10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	700
Tornado, Nev.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3.15	3.10	.....
Union Cons., Nev.	.....	.....	.....	.....	4.15	....	4 00	.....	.....	.....	.....	.....	200
United Copper	.60	.50	.55	.50	.55	.53	.55	.50	.....	.....	.58	.57	3,200

*Ex. dividend. †Dealtin at the New York Stock Ex. Unlisted Securities. ‡Assessment unpaid. Dividend shares sold, 18,795. Non-dividend shares sold, 70,220. Total New York, 89,015.
§Thanksgiving Day.

BOSTON MINING STOCK QUOTATIONS.

NAME OF COMPANY	Nov. 23.		Nov. 24.		Nov. 26.		Nov. 27.		Nov. 28		Nov. 29.		SALES.
Atlantic, Mich.	.....	.....	.....	.....	18.50	.....	18.50	.....	18.13	18.00	.....	.....	700
Bodie, Cal.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Bonanza Developm't	1.50	.....	1.50	.....	1.56	1.44	1.50	.....	.....	.....	.....	.....	700
Bost. & Mont., Copper	73.25	72 00	73.50	73.00	73.25	73.00	72 75	72 25	73.00	72.50	.....	.....	1,773
Breece, Colo.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Calumet & Hecla	310	.....	310	.....	306	305	305	300	305	300	.....	.....	260
Catalpa, Colo.	.19	.....	.19	.....	.19	.....	.18	.....	.....	.....	.....	.....	1,000
Central Mich.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Chrysolite, Colo	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Con. Cal. & Va., Nev.	.....	.....	.....	.....	.....	.....	11.13	.....	.....	.....	.....	.....	20
Dunkin, Colo.	.95	.....	.95	.....	.96	.....	.96	.....	.....	.....	.....	.....	900
Enterprise.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Franklin, Mich.	18 60	17.00	18.00	17.00	17.50	16.75	17.50	16.88	17.50	.....	.....	.....	2,229
Hale & Norcross, Nev.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Honorine, Utah	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Little Chief, Colo.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Little Pittsburg, Colo.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Martin White, Nev.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Mono, Cal.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Napa, Cal.	.....	.....	2.25	.....	.....	.....	.....	.....	.....	.....	.....	.....	100
Ontario.	.....	.....	.....	.....	32.63	.....	.....	.....	.....	.....	.....	.....	50
Osceola, Mich	.....	.....	.....	.....	21.50	21.00	21.50	.....	.....	.....	.....	.....	93
Pewabic, Mich.	5.75	.....	6.00	5.75	6.50	5.50	6.25	.....	6.25	.....	.....	.....	1,885
Quincy, Mich	86 00	.....	86.00	85.50	84.00	.....	86.00	85.00	.....	.....	.....	.....	90
Ridge, Mich.	.....	.....	2.13	.....	2 25	..	.....	.....	.....	.....	.....	.....	200
Sierra Nev., Nev.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Silver King, Ariz.	.....	.....	1.00	.....	1.13	.....	.....	.....	.....	.....	.....	.....	400
Standard, Cal	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Tamarack, Mich.	175	174	173	.....	174	173	172	.....	172	.....	.....	.....	159

NAME OF COMPANY.	Nov 23.		Nov. 24.		Nov. 26.		Nov. 27		Nov. 28.		Nov. 29.		SALES
Alloues, Mich.	4.75	4.50	4.38	4.25	4.50	4.25	4.38	...	4.00	.....	.....	.....	1,930
Arnold, Mich.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Aztec, Mich	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Brunswick, Cal.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Butte & Boston	27.00	.....	28.50	28 00	.....	.....	.....	.....	.....	.....	.....	.....	110
Canada	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Crescent, Colo.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Cusi, N. Mex.	.....	.....	.....	.05	.....	.....	.....	.....	.....	.....	.....	.....	100
Denver City, Colo.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Everett	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Hanover, Mich.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Humboldt, Mich.	.16	...	.16	.....	.....	.....	.....	.....	.....	.....	.....	.....	300
Hungarian	.18	...	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	100
Huron, Mich	.....	.....	6 75	.....	6.75	.....	6.50	.....	.....	.....	.....	.....	900
Kearsarge, Mich.	13.00	12.50	12.75	12.50	12 50	12.38	12.63	12.25	12.50	.....	.....	.....	1,970
Mesnard, Mich.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
National, Mich.	8.50	8.25	8.25	.....	8.50	8.38	8.50	....	.....	.....	.....	.....	650
Native, Mich.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Oriental & M., Nev.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Pontiac	.....	.....	.....	.....	.40	.....	.....	.....	.....	.....	.....	.....	300
Rappahannock, Va	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Rockland	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Security, Colo	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Shoshone Idaho	.....	.....	.....	.....	.30	.....	.....	.....	.....	.....	.....	.....	.....
South Side, Mich.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
St. Louis Cop.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
St. Mary's	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Washington	.....	.....	.....	.....	.30	.....	.30	.....	.....	.....	.....	.....	300
Winthrop, Mich.	.15	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	200

Boston: Dividend shares sold, 10,568. Non-dividend shares sold, 7,060. Total Boston, 17,628.

COAL STOCKS.

NAME OF COMPANY.	Par val. of sh'rs.	Nov. 24.		Nov. 26.		Nov. 27.		Nov. 28.		Nov. 29.		Nov. 30.		Sales.
		H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	
American Coal.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Barclay Coal	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Cameron Coal & Iron Co	.....	22	21	.....	.....	23	21½	.....	.....	.....	.....	.....	.....	900
Ches. & O. RR.	100	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Chic. & Ind. Coal RR.	100	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Do. pref.	100	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Col. & Hocking Coal	100	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Col., C. & I	100	33¼	32⅝	32⅛	31⅞	32¼	31½	31¾	.....	.....	.....	33	32¼	2,719
Consol. Coal	100	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Del. & H. C.	100	118¾	.....	117⅞	.....	119¼	119	120	119¼	.....	.....	118½	118¼	4,005
D., L. & W. RR.	50	137⅝	136¾	136⅝	135¾	137¼	135⅞	137¼	136¼	.....	.....	137½	136⅜	39,725
Hocking Valley	100	.....	.....	25½	24	.....	.....	.....	.....	.....	.....	.....	.....	160
Hunt. & Broad Top	.....	20	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2
Do. pref.	.....	.....	.....	.....	.....	47	.....	.....	.....	.....	.....	.....	.....	40
Lehigh C. & N.	50	51½	.....	51½	.....	52¼	51½	52¼	.....	.....	.....	.....	.....	718
Lehigh & W. B. Coal	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Lehigh Valley RR.	50	53¾	.....	53¾	53⅜	54⅛	53¾	54¼	54	.....	.....	.....	.....	1,751
Mahoning Coal RR.	100	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Do. pref.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Marshall Con. Coal.	100	.....	.....	.....	.....	.....	.....	15	.....	.....	.....	.....	.....	100
Maryland Coal.	100	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Montauk Coal	50	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Morris & Essex	100	.....	.....	.....	.....	147	.....	.....	.....	.....	.....	.....	.....	20
New Central Coal	100	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
N. J. C. RR.	50	90½	90⅝	90¼	90	.....	.....	90½	80¾	.....	.....	90	89½	2,500
N. Y. & S. Coal	100	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
N. Y., Susq. & Western	100	8⅞	.....	.....	.....	8¾	..	8⅞	.....	.....	.....	.....	.....	310
Do. pref.	100	33¼	33	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	500
N. Y. & Perry C. & I.	100	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Norfolk & Western R.R.	100	16½	16	16½	16⅜	17	16½	.....	.....	.....	.....	17	.....	960
Do. pref.	50	49	48	48	47	48⅝	46¾	48⅝	48½	.....	.....	49	47⅝	13,861
Penn. Coal	50	.....	.....	.....	.....	.....	.....	292	.....	.....	.....	.....	.....	10
Penn. RR.	50	53½	53¼	53¼	53	53½	53½	53¼	53¼	.....	.....	.....	.....	7,237
Ph. & R. RR.**	50	48½	47½	47⅝	46¾	48	46¾	47½	46¾	.....	.....	47⅝	46½	238,933
Tennessee C. & I. Co.	100	34¼	34	34¼	33	34¼	33¼	34¼	33½	.....	.....	35	34½	4,554
Do. Pref.	.....	.....	.....	95¼	95	95½	.....	.....	.....	.....	.....	.....	.....	235
Westmoreland Coal.	100	.....	.....	.....	.....	.....	.....	*67	.....	.....	.....	.....	.....	.....
Wyoming Valley Coal	..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

*Bid. †Asked.
**Of the sales of this stock, 62,663 were in Philadelphia, and 238,933 in New York. Total sales, 318,300.

San Francisco Mining Stock Quotations.

COMPANY.	CLOSING QUOTATIONS. Nov. 23.	Nov. 24.	Nov. 26.	Nov. 27.	Nov. 28.	Nov. 29.*
Alpha	.....	.....	.....	.....	.....	.....
Alta.	3.15	3.10	3.10	3.05	3.10	.....
Belcher.	.....	.....	.....	.....	.....	.....
Belle Isle.	.....	.....	.....	.....	.....	.....
Best & Bel.	8.25	7.63	7.63	7.38	7.75	.....
Bodie.	1.80	1.85	1.85	1.90	.....	.....
Bulwer.	.60	.60	.....	.....	.60	.....
Chollar.	4.30	4.05	4.05	4.15	4.25	.....
C'm'weal'h	3.90	3.95	3.65	3.95	3.90	.....
Con. C. & V	11.13	11.25	11.25	11.50	11.75	.....
Con. Pac.	.....	.....	.....	.....	.....	.....
Crown Pt.	6.63	6.38	6.38	6.13	6.38	.....
Eureka C.	3.00	.....	.....	.....	.....	.....
Gould & C.	4.85	4.75	4.75	4.65	4.70	.....
Grd. Prize.	.....	.....	.....	.....	.....	.....
Hale & N.	6.63	6.38	6.38	6.38	6.25	.....
Mexican.	5.13	4.90	4.90	4.95	4.13	.....
Mono.	1.30	1.40	1.40	.....	1.40	.....
Mt. Diablo	.....	.....	.....	.....	.....	.....
Navajo.	2.45	2.45	2.45	2.50	2.55	.....
Nev. Queen	3.05	3.45	3.45	3.75	3.55	.....
N. Belle I.	2.70	3.05	3.05	3.50	3.25	.....
Ophir.	7.75	7.75	7.75	8.00	7.88	.....
Potosi.	4.05	3.70	3.70	3.80	3.80	.....
Savage.	4.90	4.80	4.80	4.65	4.60	.....
Scorpion.	.....	.....	.....	.....	.....	.....
Sierra Nev	4.10	4.00	4.00	4.00	.....	.....
Sutro Tun.	.....	.....	.....	.....	.....	.....
Tip Top.	.....	.....	.....	.....	.....	.....
Union Con.	4.20	4.10	4.10	4.15	4.15	.....
Utah.	1.70	1.60	1.60	1.65	1.70	.....
Yellow Jkt.	6.00	5.50	5.50	5.63	5.38	.....

* Thanksgiving

of the Alta. The Justice mill has started and a dividend or two may be expected from the ore now available. Occidental is looking well, as is Con. Va. and Best & Belcher. The former sold at from $10.75 to $11.75, and the latter at $7.13. Yellow Jacket opened at from $5.88 to $6, but to-day declined to $5. Sierra Nevada was quiet at $4.05, Ophir at $7.88, Choliar at $4.25, Union Consolidated at from $4 to $4.15, Mexican at $5.13, Julia at from 50 to 55c., Exchequer at from $1.90 to $2, and Bullion at from $2.05 to $2.10. Cons. Imperial declined from $1.15 to $1.

In the Tuscarora district the concentration works are now complete and will start operations the latter part of next week. In view of this prices have improved on the San Francisco market. No sales were made on this market.

Barcelona was neglected at from 68@74c.

Sutro Tunnel stock was quiet at from 9@11c., and the Trust Certificates from 66@70c.

Plymouth shows an upward tendency, and this week advanced from $9.25@$10.25.

From Grass Valley, Nevada County, California, comes the report that it is the intention to do further work upon the Brunswick mine, which is quoted on this market. The ground is well known to mining men in that locality, and it is a matter of surprise that further money should be wasted upon it. When the present shaft was commenced, Mr. Fletcher assured the company that at a certain depth, since attained, a vein of good ore would be encountered that had been struck in the now caved in tunnel. There is not a vestige of a vein there, and many doubt the utility of sinking further, more especially as the veins in this district lie at a very slight angle, and the present shaft is said to have been sunk to a sufficient depth to cut anything in the ground.

Mr. Henry B. Murray, the President of the company, is expected in New York on the 3d inst. No sales were made in the stock this week.

Quicksilver Preferred shows one sale at $36, and a few Common at from $6.88@$7.

Bodie is neglected at from $1.75@$1.95; Mono at $1.45; and Standard was firm at $1.60.

Amador remained at $2.25; Middle Bar declined from 42@39c.; Hollywood at 46@41c., and Astoria at 24@25c.

Considerable business is being done in Colchis, which advanced from $2.05 to $2.25. Silver Mining of Lake Valley shows a few transactions to-day at from 28 to 30c.

Kingston & Pembroke shows one sale at $1.

United Copper declined from 60 to 50c., but to-day advanced again to 57 and 58c.

El Cristo shows more life, and advanced from 60 to 75c.

Some eighty shares of Ontario sold at $33.50 per share. Horn-Silver was quoted at 90c. Stormont, which seldom appears on the list, shows a sale of 500 shares at 5c. per share.

Rappahannock continues firm at 10c.

Little is doing in Homestake, which sold at $12, and Caledonia at $3.50.

Considerable attention continues to be devoted to Buffalo Iron, which went from $6.25 to $6.63, selling today at from $6.38 to $6.50.

Little or nothing is being done in the copper stocks in this market. Calumet & Hecla was dealt in to-day to the extent of 30 shares. Owing to the fire in the mine, the price declined from $307.25 to $260. Allouez sold to-day at from $4.13 to $4.38.

Alice, which has just declared a dividend of $25,000, or 6¼c. per share, shows a few sales at $1.

Sylvanite continues to be quiet at from $3.10 to $3.15. Iron Silver has just declared a dividend of $100,000. Plutus was quiet at 85c. Little Chief at 22c. Dunkin at 95c. Adams at 50c. Monitor at 4 @5c., and Cashier at 9@10c.

The Alice Gold and Silver Mining Company, of Montana, has declared a dividend of $25,000, the first since September, 1886, at which time the total dividends paid by this company amounted to $750,000. Transfer-books close on the 5th inst.

Mr. Arthur Macy, mining engineer, under whose skillful management the Silver King Mining Company of Arizona has paid so many large dividends (now aggregating $1,950,000), is at present in this city and is ready to give full information to any stockholders of the company who may desire it concerning the present condition of this property. He informs us that the great bonanza that produced last year such handsome profits is about worked out, and though the mine will probably pay expenses out of its old workings for some months, yet the future of the mine now depends on further developments which it is hoped may be made in the explorations now in progress. The company has some $75,000 cash on hand after paying its every indebtedness, and this should suffice for the exploration proposed. Mr. Macy can be addressed care of ENGINEERING AND MINING JOURNAL. The stock was active at from .88@$1.10.

Auction Sale of Stocks.

The following securities were sold at auction in this city at the Real Estate exchange on the 26 inst., by order of L. E. Whiton, administrator.

110 shares New York Press & Seal Co., 40 shares Cons. Batopilas Silver Mg. Co. pref. $18 for lot; 80 shares Cons. Batopilas Silver Mg. Co., $2 for lot; 100 shares Bobtail Tunnel Co., $2 for lot; 500 shares Gregory Bobtail Co., 1000 shares Los Angeles Gold Mg., Land & Water C., $4 for lot; 300 shares Consolidated Gregory Co., 500 shares American Antimony Co., $2 for lot; 66 shares Mariposa Land & Mg. Co. of Cal., 500 shares Mariposa Land & Mg. Co. of Cal., pref., 40 shares Mariposa Land & Mg. Co. of Cal., scrip., $4 for lot; $2000 Calaveras Water & Mg. Co. bonds, 200 shares Calaveras Water & Mg. Co., 1000 shares New York & Calaveras County Gold Mg. Co., $2 for lot: 10 shares Grimshaw Insulated Wire & Cable Mg. Co., 4900 shares Cons. Yankee Fork Gravel Mg. Co., 100 shares Desoris Mg. Co. $300 for lot; 10 shares Pneumatic Tramway Engine, 100 shares Tioga Cons. Mg. Co., $2 for lot; $3600 shares Juniper Gold Mining Co., 100 shares Titus Estate Petroleum Co., 200 shares Quartz Hill Gold Mfg. Co., $2 for lot; 200 shares Mutual Electric Light and Supply Co., 150 shares Oil Valley Petroleum Co., 25 shares Sugar Creek Developing Co., 50 shares Sugar Creek Oil Co., $1 for lot; 1125 shares New York Merchants' Petroleum and Coal Co., 1000 shares Great Eastern Gold Mg. Co., $1000 New York & Penn. Blue Stone Co. bond, $1 for lot; 110 shares Vermont Slate Co., $4 for lot; 3000 shares Copper Prince Mg. Co., 5500 shares Bonanza & Union Tunnel Mg. Co., $1000 Bonanza & Union Tunnel Co. bonds, $1 for lot; 350 shares American & Mexican Silver Mg. Co., 500 shares Drexel Gold and Silver Mg. Co., 25 shares Equitable Mg. Co., $1 for lot; 500 shares Keewatin Mg. Co., Lt., 10 shares Cosett M. Co., 2500 shares Bross Con. Mg. Co., 610 shares Rocker Silver Mg. Co., $3 for lot; 500 shares Singleton Gold Mg. Co., 2500 shares Morocomo Gold Mg. Co., 200 shares Shoshone Gold Mg. Co., 2 shares Dry Placer Mg. Co., 5 shares Electric Alarm Life Saving Co., $9 for lot.

Dividends.

The following have been declared:

Alice Gold and Silver Mining Company, of Montana, six and one quarter cents per share, or $25,000, payable December 10th, at the Farmers' Loan and Trust Company, New York City.

Charleston, S. C., Mining and Manufacturing Company, quarterly dividend, two dollars and a half per share, and an extra dividend, one dollar per share, payable December 1st, at 132 Walnut street, Philadelphia, Pa.

Chicago & Indiana Coal Railway Company, quarterly, one and one half per cent on preferred stock, payable December 1st, in New York City.

Delaware & Hudson Canal Company, quarterly, one and one half per cent, payable December 15th at No. 21 Courtlandt street, New York City.

Iron Silver Mining Company, of Colorado, dividend No. 24, twenty cents per share, or $100,000, payable December 19th, at the office of the treasurer, John M. Nicol, 145 Griswold street, Detroit, Mich.

Lehigh Coal and Navigation Company, semi-annual, two and one half per cent, or one dollar and twenty-five cents per share, payable December 11th.

Michigan Iron and Land Company, one dollar and a half per share, declared November 23d.

People's Gaslight and Coke Company, of Chicago, second mortgage bond coupons, due December 1st, payable at Central Trust Company, No. 54 Wall street, New York City.

Seattle Coal and Iron Company, first mortgage bond coupons due December 1st, payable at Manhattan Trust Company, New York City.

Whitebreast Fuel Company, of Ottumwa, Iowa, coupons due December 1st will be paid on presentation at Atlantic Trust Company, 29 William street, New York City.

Assessments.

COMPANY.	No.	When levied.	D'l'nq't in office.	Day of Sale.	Amn't per share.
Alpha, Nev.	24	Nov. 3	Dec. 8	Dec. 28	.87½
Alpha Cons., Nev.	2	Nov. 3	Dec. 8	Dec. 28	.25
Andes, Nev.	34	Oct. 5	Nov. 12	Dec. 3	.25
Bear Butte, Dak.	3	Oct. 22	Nov. 30	Dec. 17	.002½
Benton Cons., Nev.	18	Oct. 29	Dec. 3	Dec. 24	1.00
Best & Belcher, Nev.	41	Oct. 16	Nov. 21	Dec. 11	.25
Blue Bird, Dak.	3	Oct. 25	Nov. 26	Dec. 17	.001
Caledonia, Nev.	43	Oct. 19	Nov. 21	Dec. 12	.15
Chollar, Nev.	26	Oct. 8	Nov. 13	Dec. 5	.50
Concordia, Nev.	2	Nov. 12	Dec. 13	Dec. 29	.50
Cons. Imperial, Nev.	25	Oct. 16	Nov. 21	Dec. 12	.05
Cora, Dak	3	Nov. 10	Dec. 15	Jan. 10	.01
Del. Monte, Nev.	1	Oct. 15	Nov. 20	Dec. 12	.25
Found Treasure, Nv.	4	Oct. 25	Nov. 30	Dec. 21	.06
Garden City, Dak.	2	Nov. 3	Dec. 3	Dec. 18	.001
General Crook, Dak.	5	Oct. 12	Dec. 1	Dec. 20	.002
Gibraltar Cons., Cal.	23	Oct. 19	Nov. 19	Dec. 1	.30
Golden Reward, Dak.	3	Oct. 14	Nov. 21	Dec. 8	.02
Grand Prize, Nev.	19	Oct. 12	Nov. 17	Dec. 5	.25
Gray Eagle, Cal.	10	Nov. 13	Dec. 18	Jan. 8	.05
Horseshoe Bar Cons., Cal.	1	Oct. 9	Nov. 17	Dec. 10	.25
Huron Mt. L. & M., Mich.	....	Nov. 5	Dec. 5	.....	.02½
John Duncan, Mich.	....	Nov. 14	Dec. 15	.....	.25
Keyes, Nev.	3	Oct. 22	Nov. 24	Dec. 15	.25
Last Chance, Cal.	13	Nov. 9	Dec. 11	Jan. 5	.10
Live Oak Drift, Cal.	11	Nov. 19	Dec. 21	Jan. 16	.05
Monarch, Dak.	7	Nov. 20	Dec. 22	Jan. 6	.01
Montrose, Colo.	1	Oct. 3	Dec. 26	*Jan. 28	.01¼
Mayflower, Nev.	43	Oct. 16	Nov. 16	Dec. 10	.50
North Belle Isle, Nv.	13	Oct. 23	Nov. 27	Dec. 19	.50
N. Commonw'th, Nv.	1	Oct. 15	Nov. 19	Dec. 11	.30
Overland, Idaho.	..	Nov. 1	Dec. 10	Dec. 31	.30
Potosi.	31	Oct. 1	Nov. 6	Nov. 27	.50
Russell, Cal.	3	Oct. 18	Nov. 26	Dec. 17	.10
San Luis, Cons., Cal.	20	Oct. 17	Nov. 17	Dec. 1	.00108
Seabury Calkins, Dak.	10	Oct. 15	Nov. 20	Dec. 10	.06¼
Sierra Nevada, Nev.	93	Nov. 9	Dec. 13	Jan. 2	.25
Silver King, Dak.	1	Nov. 2	Dec. 3	Dec. 18	.001
Spruce Gulch, Dak.	3	Sept. 19	*No. 15	*Dec. 3	.001
Trent, Dak	1	Nov. 9	Dec. 11	Dec. 28	.001
Troy, Dak.	2	Nov. 1	Dec. 6	Dec. 22	.002
Tuscarora, Nev.	1	Oct. 1	Nov. 4	Dec. 5	.05
Wall St., Dak.	1	Sept. 20	*No. 13	*Dec. 10	.001½

*Delinquent day and day of sale postponed to dates given above.

Meetings.

Fort Payne Land and Improvement Company, office of R. H. Pearson, Birmingham, Ala., January 7th, at twelve o'clock noon. Special meeting for the purpose of considering and voting upon a proposition to sell the entire property of the company.

Gipsey Maid Consolidated Mining Company, No. 53 Broadway, New York City, December 17th, from two till three o'clock P.M.

Pipe Line Certificates.

Messrs. Watson & Gibson, brokers, report for the week as follows:

The petroleum situation is very strong, and the month of November will not only show a reduction in stocks of about a million of barrels, but also a number of wells building and rigs up and building. The statistical and commercial situation of the commodity is very strong, and the only thing the market lacks now is a little bit of interest on the part of the public, and we think they are very likely to recognize soon the growing strength of the situation.

NEW YORK STOCK EXCHANGE.

	Opening.	Highest.	Lowest.	Closing.	Sales.
Nov. 24	86⅞	87⅛	86⅛	86⅞	346,000
26	86⅛	86¾	85⅞	85⅞	310,000
27	86⅛	86⅛	85¼	85⅝	527,000
28	85⅝	86	85⅜	85¾	309,000
*29	....	....	....	....	.....
30	86⅛	87¼	85½	86⅞	554,000
Total sales in barrels					2,046,000

CONSOLIDATED STOCK AND PETROLEUM EXCHANGE.

	Opening.	Highest.	Lowest.	Closing.	Sales.
Nov. 24	86⅞	87½	86¼	86⅛	563,000
26	86¾	86⅞	86	86¼	347,000
27	86	86	85⅛	85⅜	655,000
28	85½	85⅞	85¼	85⅜	389,000
*29	....	....	....	....	.....
30	85¾	87¼	85½	86⅞	1,166,000
Total sales in barrels					3,120,000

A new rule adopted this week by the Board of Managers will go into effect at the Consolidated Stock and Petroleum Exchange on January 1st. Pipe Line certificates are sold at present only for immediate delivery; the new rule allows the sale of "options," and moreover all sales of Pipe Line certificates for future delivery will be made through the Clearing House of the Exchange.

Boston Mining Stocks.

Nov. 28.

[From our Special Correspondent.]

This has not been much of a week for the bulls in copper stocks. Nearly all of the list has been heavy, and the tendency is to still lower prices. The market is a waiting one, and there is not much disposition to load up with stocks until something definite is announced regarding the extension of the copper syndicate. This question definitely settled, and we look for greater activity and much higher prices. Calumet & Hecla took a drop from $316 (Nov. 20) to $300, and there seemed to be considerable stock pressing for sale. We cannot learn that there is anything in the future outlook of the company to warrant the decline, but then, this stock was always hard to comprehend, and its course is difficult to predict.

Boston & Montana has been fairly active, and declined from $73 to $72, but recovered in the later sales to $73, and was fairly strong at quotation.

Franklin has been more largely dealt in this week, but, notwithstanding the more favorable reports from the mine, it declined from $18 to $16⅝, recovering later to $17½. About 2000 shares changed hands.

Kearsarge was the next in point of activity, with a decline from $13⅝ to $12¼, and was inclined to be heavy at the latter figure.

Quincy declined from $87 to $84, with later sales at $85.

Atlantic declined from $19 to $18, and Osceola dull at $21.

Tamarack was weak, and declined from $175 to $172.

Butte & Boston sold at $27 to $28⅛.

Allouez declined to $4¼, and was offered at that price to-day. It is rumored that another assessment is probable.

National steady at $8¼ to $8½.

Pewabic advanced from $5¾ to $6½ on sales 1300 shares.

Bonanza dull at $1½.

Nothing doing in silver stocks, except Dunkin, which sold at 95c.

LATER PRICES.

(*By Telegraph.*)- November 30th.—The market is weak, owing to news just received of the breaking out of a fire, believed to be of incendiary origin, at sixth level in Calumet No. 3 shaft, of the Calumet & Hecla mine. Calumet & Hecla stocks declined to $255, and closed at $263 to $265; Tamarack, $172; Boston & Montana, $74½; Osceola, $21.50 asked; Atlantic, $18; Allouez, $4; Kearsarge, $12 bid; Pewabic, $6; National, $8¼ bid.

London Mining Stock Market.

On the London market American mines are neglected, attention being centered in South American and South African ventures. The latter have been doing well, showing good returns upon the small milling capacity. Prices are fully maintained and Carlisle, Montana and Dickens-Custer have slightly improved.

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Use Horsford's Acid Phosphate.

Dr. C. R. DAKE, Belleville, Ill., says: "I have found it, *and it alone*, to be capable of producing a sweet and natural sleep in cases of insomnia from overwork of the brain, which so often occurs in active professional and business men."